

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Duryee's Petroleum Furnace.

Iron making with petroleum has lately attracted considerable attention, and we have, in a recent issue, given a brief account of the process as conducted by the Poughkeepsie Iron and Steel Company, New York. We illustrate this week Mr. Duryee's petroleum furnace, from the engravings of which it will be seen that the petroleum is blown into the furnace, in the form of spray, by a current of air. It is ignited by the fire in the furnace 5, and the intense heat which results is utilized in reducing the ores. The weight of the furnace here shown is about 100 tons, its length being 120 feet and its inclination 5 feet. It is capable of reducing about 4 tons of ore per hour. In our engravings, A is a longitudinal section; B is a section along the line A-B, showing the furnace door and the nozzle through which the air blast is forced (see Fig. 3, page 3); and C is a top view. The revolving cupola is designated by number 1, while 2 and 3 repre-

friction rollers, 20; the upper or reducing chamber of the cupola is supported in a similar manner. The fuel furnace 5 is supported by rails, 32, resting on columns some 7 feet above the ground. The manner of operating is as follows: A coal fire started on the grate in the fuel furnace 5, is continued until the furnace is white hot; coal dust is then introduced freely through 7, while petroleum is allowed to enter through the pipe 17. The valves 25, 26 and 27 are next opened, and a compound oxyhydrogen blow-pipe flame, from 20 to 40 feet long, enters the cupola through the nozzle 4. The flame is deflected upward by the bridge 4, thus protecting the blooms from the action of the oxidizing flame. The iron ore, introduced through the funnel 23, should be mixed with a proper proportion of burned lime, or preferably 2 per cent. feldspar. About 250 pounds of coal dust should be used per ton of ore introduced. The great length of the furnace is the secret of its success in reducing ores, and since the intense heat produces a

The iron was found to bend readily when cold, and exhibited a steely fracture. This effectual and simple method of eliminating the phosphorus is deserving of special praise, several subsequent tests giving similar results. Several tons of the following mixture were on one occasion introduced into the furnace, and the resulting blooms rolled into bar iron at the Wyandotte Rolling Mill:

Lake Superior hematite	Pounds.
Lake Superior "Republic"	100
Lake Champlain phosph. sand	100
Lake Superior specular	100
Feldspar	10
Clay ("Duryee's")	15
Slag	10

In the tests made with this iron the following results were obtained:

Tensile strength	Pounds.
Elastic limit	54,900
Elongation	33,400
Reduction of area of bar	Per cent.
	12.1

could not detect any iron going to waste. The process in the reducing chamber is such that there is no possibility of a loss. The heat when required is so quickly produced and can be so entirely kept under control that the present evils and expenses attached to blooming out blast furnaces are quite done away with. The purity of the iron produced by Mr. Duryee's process renders it specially desirable for boiler plates. The satisfactory results derived from experiments conducted with the furnace confirm the success of using petroleum in iron-making, and ironmasters will undoubtedly look forward to further developments with increased interest. Working drawings of the furnace may be seen at Mr. Duryee's office, 176 Broadway, New York.

Peru and Chili.

The published correspondence between the Department of the Secretary of State at Washington and the American Minister to

war, and England will absorb the business as she absorbs the trade of Portugal, of Egypt of Australia or of Bengal."

The gist of Mr. Blaine's complaint is found in the single sentence, "I dislike to see England winning great commercial triumphs in a field that legitimately belongs to the United States." The result, he contends, destroys American influence on the South Pacific Coast and literally wipes out American commercial interests in that vast region. Much as we may deplore such consequences, if indeed they are truly depicted we have reason to call in question the bungling diplomacy by which it was sought to avert them.

Cable Road in Chicago.—The cable road on State street, Chicago, was put in operation January 28. The cable rests on pulleys set in an iron framework under the streets. As the "grip" attached to the car passes along with the cable it simply lifts the cable from the pulleys,

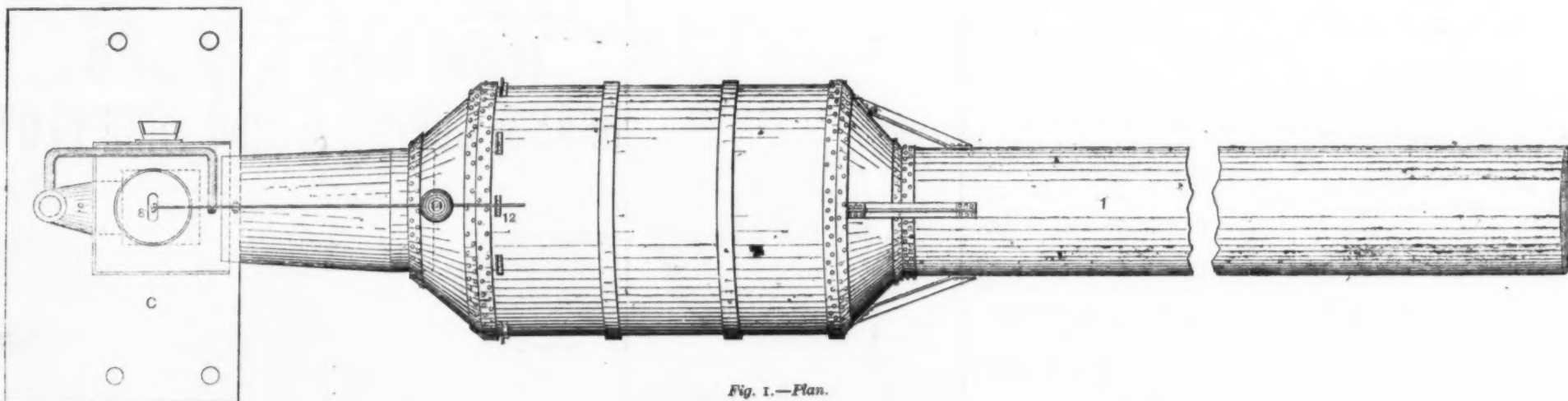


Fig. 1.—Plan.

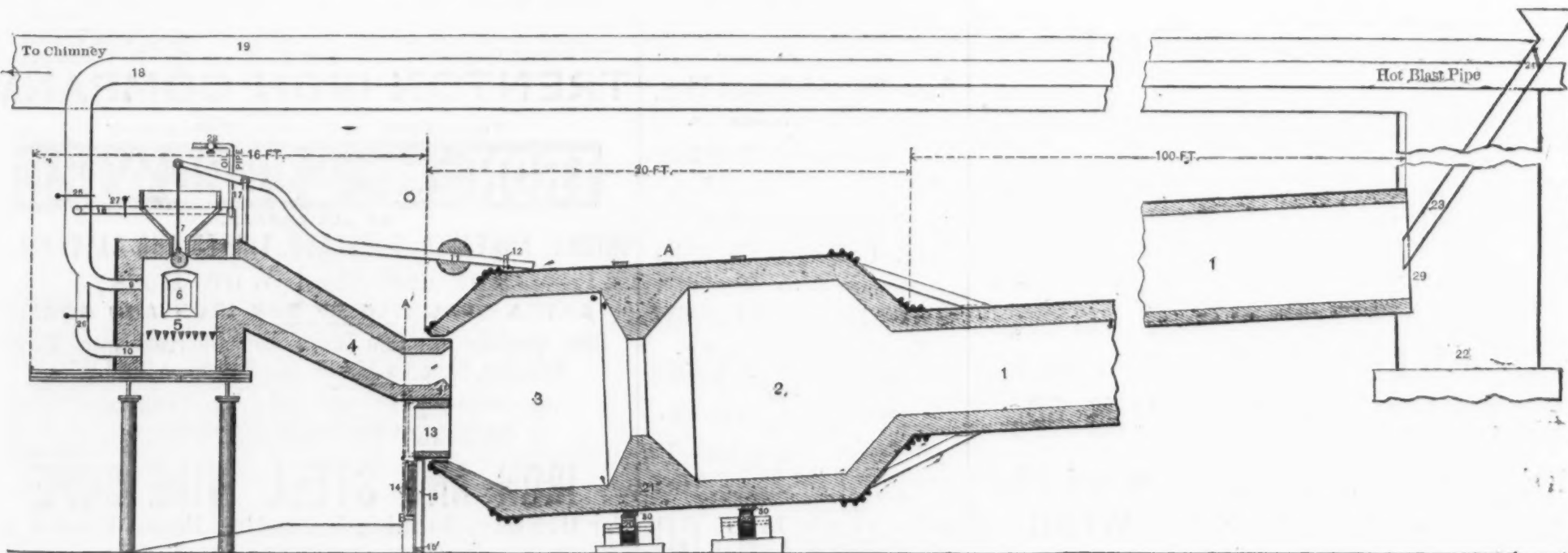


Fig. 2.—Vertical Section.

DURYEE'S PETROLEUM FURNACE.

sent the puddling hearths, which are 10 feet wide and about 8 feet long. The air current, together with the petroleum, passes through the furnace 5, and is led by the inclined nozzle 4 into the cupola. The furnace is supplied with coal dust for reducing ores by means of the feeding arrangement 7, the supply being regulated by a valve, 8, provided with a lever and sliding weight, 11. This lever is so connected with the revolving cupola that, for each revolution, the valve 8 is opened, admitting a certain quantity of fuel. The blooms of iron may be removed through the door 13, which, when required, is closed by a sliding door, 14, made of fire-clay and working against a water jacket, 15, water being supplied by the pipe 15. The flue 19, besides carrying away the products of combustion, serves to heat the air passing through the pipe 18. The blast is produced by a blower capable of delivering about four tons of air per hour, and the air currents enter the furnace through the pipes 9, 10 and 16; 25, 26 and 27 are valves in the air-blast pipes. The petroleum is supplied by the pipe 17, which is provided with a cock, 28. The plumbago lining (21) of the puddling cylinders is, as before stated, about 12 inches thick; 22 is an air chamber through which the ore funnel 23 passes, entering the cupola through the flanged end 29. A drop-valve, 24, in the funnel regulates the supply. The puddling cylinder is supported by tires, 30, which are 6 inches wide and 2 inches thick, resting on

very liquid slag, the resulting blooms are remarkably clean and free from cinder. Taking advantage of the fact that chloride of phosphorus is volatile at about 3000° F., Mr. Duryee conceived the idea of introducing chloride of sodium (common salt) through 7, thus effectually removing the phosphorus in the ores. Mr. Geo. Webb, of the Cambria Iron and Steel Co., Johnstown, Pa., made a series of tests with their furnace and pronounced the results as highly satisfactory. An analysis of the ore used, which was magnetic and came from Lake Champlain, gave the following results:

Ore	Per cent.
Metallic	51
Oxygen	34.49
Organic Matter	.31
Sulphur	.03
Phosphorus	1.28
Insoluble Matter and silica	16.61
Lime	3.55
Alumina	.80
Manganese	.09
Magnesia	.73
Moisture	.77

Total. A ton of this ore, together with 50 pounds of feldspar, 200 pounds of clay fed in upper end and 15 pounds of salt, was fed through the feeding arrangement 7, and the resulting blooms were found to contain .06 per cent. carbon and .015 per cent. of phosphorus. In the tests made with the iron the elastic limit was found to be 32,000 pounds, the tensile strength 49,250, elongation 20 per cent., and reduction of area 30.28 per cent.

It seems that almost any desired quality of iron can be produced by this process. A titaniferous iron ore containing about 30 per cent. of titanic acid was successfully reduced in one instance, the estimated heat required to produce fusion being about 4000° F., or a flame 70 feet in length. The lining of the upper part of Mr. Duryee's furnace consists of fire-brick, while the puddling cylinder is lined with plumbago, with a facing of titaniferous ore, resisting a temperature of nearly 5000° F. Probably the largest bloomery in the world, intending to use Mr. Duryee's furnace, is now being established in Montreal, Canada, the capital amounting to nearly \$1,000,000. According to Mr. Duryee, the success of the furnace largely depends upon its length, and he states that the latter will probably be 200 feet at no distant date. Mr. Duryee has also demonstrated that all precious metals are volatile, and one of his furnaces in Colorado is now distilling metals from their ores. The process of condensation, though novel, is said to be successful.

In the report of the expert who tested the furnace for Montreal capitalists it is said: "In the run of 4 tons of mixed ores and fluxes the reduction was complete, as shown by the small quantity of slag. The production of about fifteen hundred pounds of blooms, and of about one ton of sponge iron, with 60 gallons of petroleum, is, in our opinion, the greatest achievement in the production of iron. I examined the slag closely at intervals as it was tapped, but

Chili and Peru, has brought out Mr. Blaine in an attempted vindication of the late administration. He disclaims any intention beyond the exercise of a wise diplomacy, to save, if possible, the nationality of Peru and to preserve her from territorial spoliation. He says:

"What Chili is taking from Peru is relatively a far greater loss to Peru than the loss of the eleven seceding States would have been to the American Union. Far greater than that; greater, indeed, than if the Pacific Coast had joined the rebellion and gone out forever. That would have taken all the cotton lands, all the sugar lands, and all the precious mineral lands from the United States, and would have destroyed our power and our very existence. Precisely that fate is to be inflicted upon Peru, and Chili now permits the United States to mediate only on condition that she will permit this wholesale destruction of a friendly republic—a destruction as complete and as cruel as the partition of Poland. Chili's victory throws the whole Peruvian business into English hands. The export of guano and nitrate is already nearly 700,000 tons per annum and will rapidly increase, all from Peruvian territory and all now absorbed by Chili. English bankers will furnish the money, English merchants will transact the business, English ships will carry the cargoes. Over 800 ships are already engaged in the trade. Chili will gain from it in two years more than the entire cost of her

allowing it to drop and rest upon the pulleys again after the car has passed. The cable is driven by a number of powerful engines stationed at Twenty-second street, and can be run at the rate of twenty miles an hour. From one to four of the ordinary street cars will be attached to each "grip-car." The "grip-car" itself is provided with reversible seats and will serve as a smoking car, carrying from twenty to thirty persons. It looks very much like an open car, with an aisle through the center from end to end, thus making two rows of seats on each side. Occupants step off or on by a side footboard as on summer cars. The engineer or driver stands in the center of the car, and by operating a lever stops, starts or regulates the speed of the cars. The only change made in the cars already in use is in substituting a new draw-bar, by which attachment is made to the grip car.

Eight silver vases have been found in a tomb in Sweden, and have been bought by the Stockholm museum. Four date from the fourteenth century, one is accredited with the twelfth century, and the other three are older still. All bear quaint designs and have a Runic inscription.

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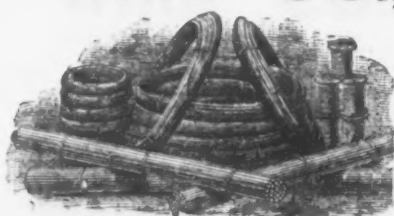
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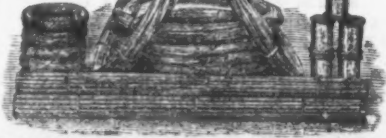
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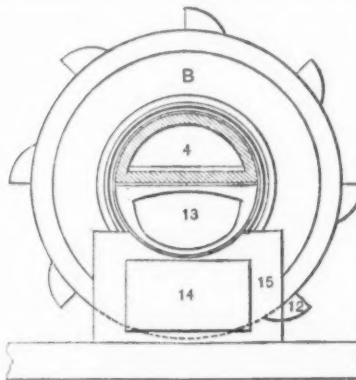
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Blast Furnace Slag and Its Uses.

Mr. Charles Wood, of the Tees Iron Works, Middlesboro', England, lately read a paper before the Cleveland Iron Trade Foremen's Association, on the uses of blast-furnace slag as applied to the manufacture of bricks, cement, mortar, &c. Mr. Wood, after referring to the enormous quantities of slag annually produced, and after passing in review other slags produced in many metallurgical operations, described the nature of blast-furnace slag, and detailed the uses for which it has been, and is still, largely employed. It was used for road making for a number of years, and, lately, the construction of breakwaters has exhausted large quantities. In the manufacture of slag castings there has been one successful exception to the numerous failures, and by a compound process it may be converted into glass for bottle making. A chemical analysis of the chief slags produced in Great Britain was given, the analysis showing that the three most important component parts of these slags were silica, alumina and lime, which formed about 90 per cent. of the whole. The two latter of these, however, chiefly exist as silicates. If to these caustic lime be added, the silicates are acted upon, and if the material be kept damp and exposed to the air, hardening is carried on for months. If caustic lime be added to slags poor in lime, so as to bring this element up to 55 or 60 per cent., it would be seen at once how closely it resembled the analysis of Portland cement, the composition of which is: Lime, 60 per cent.; silica, 24 per cent.; alumina, 8 per cent.; oxide of iron, 4 per cent. It appeared an absolute necessity for obtaining good results that the ferruginous material be calcined or roasted, the effect of which

alumina, sulphur and magnesia in a condition like the white, soft slag sand, suggested its application as a fertilizer for some kinds of land. Three years ago, through the kindness of Earl Cathcart, it was brought before the Royal Agricultural Society, and Doctor Voelcker reported that the result of his examination showed that it may be usefully employed upon moorland and peaty soils as a cheap and effective substitute for lime. Since this report was made many hundreds of tons had been sold for this purpose, and although there was only 32 per cent. of lime in the slag supplied, the result had been very satisfactory, particularly on land growing potatoes. Had it been Bessemer slag, containing from 40 to 50 per cent. of lime, there could not be a doubt but that the results would have been still more satisfactory, and he felt sure that it would in some localities find a large outlet for this purpose. There now remained only one more application of blast-furnace slag for him to describe. It was the manufacture of slag wool or silicate cotton, so called from its resemblance to cotton wool. The first attempt at this manufacture was in 1840, by Mr. Edward Parry, in Wales, and a large quantity was made, but no effort appeared to have been made to confine the wool after production, consequently it floated about the works with the slightest breeze, and became so injurious to the men that the process had to be abandoned. About four years ago Herr Krupp, of Essen, and a little later Herr Lurmann, of Georgsmarienhütte, in Hanover, both supplied a great deal to the market, but the precise methods of manufacture had never transpired, having been kept a secret at the works; and until two years ago it had never been made successfully in England. Between 5 and 10 tons of this wool are produced weekly at the Tees Iron Works. The paper was illustrated by diagrams showing the new slag shipping apparatus for taking the slag to the North Gare breakwater, a slag cooling or slag shingle machine, a slag-sand machine, a slag brick machine, the building and machinery used in carrying on the manufacture of bricks, &c., at the works, the machine and ovens used for making the slag pavers by the Tees Scoria Brick Company, and also the apparatus used in the manufacture of slag wool or silicate cotton.



Duryee's Petroleum Furnace.—Fig. 3.—Section through A' B', Fig. 2.

was to drive off the carbonic acid and water; and the reabsorption of the water, which united in chemical combination with the material, afterward assisted in hardening. The speaker proceeded to say that the most important production, and the one which consumed by far the greatest quantity of slag, were concrete bricks—known in the market as slag bricks—made from the sand produced by the slag-and machine which he described. The bricks produced (by the process described) were very tough, would not split when a nail was driven into them, were easily cut, would not break in transit, and were impervious to frost. According to a certificate received from Kirkcaldy's testing works, some of these bricks, taken from stock three years old, carried a pressure of twenty-one tons before crushing, while others only four months old were crushed with nine tons pressure, showing not only great toughness, but also that they greatly improved by age. The weight of these bricks was about 30 per cent. lighter than ordinary red ones—9 x 4 1/2 x 2 1/2 inches—weighing only 2 1/2 tons per thousand. Another interesting feature was the economy in manufacture. The process of brickmaking, as now carried on, was extremely simple and inexpensive. The next product mentioned was that of slag cement. The word cement had sometimes been objected to in connection with this material, because it was generally manufactured in a wet state, and had to be used within a few hours of its being made. Upon this point he expressed no opinion, simply mentioning the fact that in point of strength he found little difference whether the materials were ground together in a dry or in a wet state. The cost of production, however, was, as nearly as possible, four to one in favor of the wet state. It was made by grinding under edge runners for about an hour (the finer the better) 70 per cent. of slag sand, 15 per cent. of common lime, and 15 per cent. of iron oxides, calcined ironstone, or spent pyrites. It required longer to set than Portland cement, and was, perhaps, not quite so hard; but there was a remarkable toughness which had surprised all those who had used it, and this toughness made it valuable for heavy machinery foundations, &c.; and when made in proximity to the furnaces the cost of the cement did not exceed 6/ per ton, while concrete made of this cement and slag shingle cost only 5/6 per cubic yard. These prices were absolute figures of cost, and he knew of no material at a similar price which could compete with it. Slags from the furnaces making Bessemer iron were better adapted for this cement even than those from the Cleveland Slag Works. It was simply made by grinding the slag sand with about 6 per cent. of slaked lime in an ordinary mortar mill, and (if ground fine) made a far better mortar than was generally employed by builders. As with the other slag products, its remarkable strength and cheapness combined made it much liked by those who, in close proximity to the works, obtain it freshly made.

Belgian Competition with British Iron.

Concerning this subject the Newcastle Chronicle says:

While America has gone in strongly for "notions" in metal, Belgium has made its strong point manufactured iron for the building trade. The patriotic British fair trader makes use of both individually; collectively, he does not say much about hammers and corkscrews, but is very hot and strong on the subject of Belgian girders. Wherever two or three of our fair traders are gathered together Banquo rises in the shape of iron beams—their "skeleton at the feast" is a network of ties and girders proclaiming our industrial decadence. All this is a veritable case of "much ado about nothing," for the manufactured iron which competes with our own make is only 3 per cent. of the total made in this country. Last year we imported 281,000 tons of iron and steel. Part of this was bar iron, part manufactures—such as the notable girders—and a very small part was unwrought steel. Bar iron—less than again exported—is largely Swedish, and is used by the converters of Sheffield for finest steel manufactures, for which its suitability has for ages been proved. The "iron manufactures" include some of the American "notional goods," but they are chiefly girders and joists, and Belgium may be said to be the main source of our supply. But it is worthy of note that the contention of the fair traders is not fully accurate, for the Belgians do not take our cheap pig and make it into the girders they send us. While our ironmasters have devoted time, energy, and capital to producing cheap rails, cheap plates and angles and cheap bar iron, Westphalia and Belgium have, to use a mercantile phrase, made a special "line" of joists, girders and kindred work. They find their iron adapted for it; they have devoted themselves to it, and they have put down special machinery. Recently there was only one mill in the North of England for the production of "wide, flat bars," by a process that is common in Belgium; and it is first to the special cultivation of this class of trade (and its partial neglect by England) that the determination of the trade to Belgium is due, though it is aided by cheap transit and other allied causes. But when it is remembered that Cleveland and Durham make more manufactured iron than the whole of Belgium, it must be acknowledged that our commercial prosperity has not departed even with the girders. To those who believe in the words of Douglas Jerrold, that foreigners are produced by benevolent nature to "bestow pleasure and profit on a free-born Briton," that conclusion may be arrived at, but to few others. But the fact that we do import, as we have this year, 14,000 tons of iron manufactures monthly—chiefly girders and joists—is one that is worth the attention of our ironmasters, and especially of the ironmasters of the North. In some of the Midland iron districts the girder trade is considerable, and there is demand sufficient to make it worth the while of the Northern iron manufacturers to cultivate that trade. It is not the fact that Belgium sends us a few tons of joists cheaper and more suitable than our own makers produce them that is important; the special fact that makes it worth the attention of our ironmasters is, that if that country can beat us in our prodigally endowed mineral domain, it can also compete with us elsewhere. That is the grave fact that fair traders overlook, while they are agitated at a few girders landed on our shores. To retain, then, our foreign trade, we must enter more fully into that which the plucky Belgians have cultivated, and which in the future will probably grow in greatness of the demand. The girders do not arise like the ghosts to remind us of our folly in leaving them untaxed on entrance into this land, but they do suggest the inquiry whether we are not neglecting a trade that is worth entering into, one that would give the demand to set some of our idle mills to work and relight some of our cold-blast furnaces! Bel-

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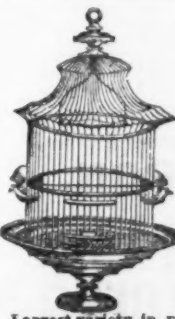
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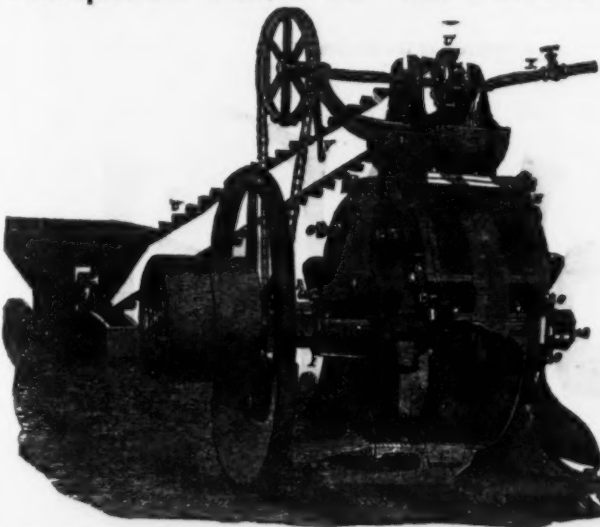
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punched through at the proper angles and free
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kegs of unfinished shoes.

gum charges less for the carriage of her
ironmaking materials than do our railroads;
she taxes her people and her traders less,
and in other ways gives them facilities that
we need here; and it is possible that our
manufacturers will have to look to cheap
transit and lesser taxation to enable them to
compete better. The question will ultimately
land us in the consideration of the cost of
transit here, and the pressure of taxation,
while it also suggests an inquiry into the
hours of labor and the payment. The only
way to obtain and retain trade is to produce
cheaply and well—the Belgians have striven
successfully to do this in regard to joists and
girders, and if we are to command that
portion of the trade it will have to be by
similar means.

Steamy and Frosted Store Windows.

The Ironmonger discusses as follows a sub-
ject of interest to all retail tradesmen:
What is the cause of steamy windows?
The hackneyed answer that the cold outside
condenses the moisture of the air is undoubt-
edly correct, but it does not explain how the
moisture gets into the air. And as the air
in the shop is warmer than that outside, its
power of retaining water in a vaporous con-
dition is very much increased, so that the
watery vapor in the air of the shop must
greatly exceed that of the external air, or no
deposit of moisture would take place. It is
certain that the greatest deposit of moisture
takes place in warm, well-closed shops, and
the idea that the warmth has something to
do with the deposit is a very natural one. A
walk along the streets in a winter evening
shows that the amount of moisture on the
windows varies very much in different shops.
Some will be almost free from it, others are
as opaque as if they were of ground glass.
For some time we have been trying to find
the reason for this, and although we cannot
explain all the anomalies we meet with, yet
we think some light can be thrown on the
matter. The best lighted and warmest shops
seem to suffer most. Now, as warmth ought
to decrease the deposit, provided the air
could take up no more water as it got warmer,
we must look for some means by which the
proportion of watery vapor in the air is in-
creased with the temperature. This is at
once found in the gas, which is almost uni-
versally used for lighting and very often for
warming. For the amount of light given
out gas produces very much more water
than either oil or candles. If the ventilation
be thorough enough to keep the air of the shop
nearly at the same temperature and humidity
as that outside, no moisture will be deposited
on the window. But if the air is at all con-
fined, as the assistants will certainly wish it
to be, then as long as gas is burned and the
products of combustion allowed to escape into
the air, so long will the windows be obscured
by moisture. As gas is the great offender, it
is useless to provide air-tight windows, at
enormous cost, if they be lighted with gas
inside. We know a shop where some hundreds
of pounds were spent in air-tight cases for
the windows, where this mistake was made.
Another source of moisture is the breath of
the assistants and customers, and this seems
to be sufficient to make it impossible to avoid
all deposit on the windows. But if petroleum
or electricity be used to light the shop, or if
the products of the combustion of the gas be
carefully removed, then the nuisance will be
greatly mitigated. Some shops are lighted
by "Sun" burners on the ceiling. The
effect, as regards illumination, is excellent,
and this plan makes it very easy to remove
the products of combustion. Of course, if a
gas stove be used to warm the place, and the
products of combustion allowed to escape into
the shop, neither petroleum nor electricity
will prevent steamy windows. Various con-
trivances—such as open gratings at the top
of the windows, double sashes, &c., have
been tried, but the measure of success
achieved appears to have been irregular and
often disappointing.

**Steel Production in the North of
England.**—The London *Engineering* says:
"The output of steel in the Northeast of
England has been very materially increased
in the year 1881. It will be long before there
are reliable figures procurable as to this
branch of the metallurgical industries of the
North, but the fact of a larger output is cer-
tain. The number of Bessemer converters
in the Northeast of England has been very
greatly increased, and of late the increase in
the capacity and in the total production has
been more than equal in its growth with the
increase in the number of vessels. At the
present time, too, the whole of the works are
very briskly occupied. In November the
production of steel rails from the works of
Bolckow, Vaughan & Co., at Eston, has been
raised to 4500 tons weekly, and that of the
smaller works of the Darlington Iron Com-
pany has been brought up to about 1200 tons.
Remembering that the Erwin Works have
been commenced at South Stockton, too, it
may be believed that although there may not
have been so large an output in the early as
in the late months of the past year, the total
production of Bessemer steel in the North of
England must have been double what it was
in the previous year. And there are indica-
tions that there will be a continuance of that
growth, for the whole of the steel mills are
active, and the tendency at the present time
is to enlarge the output, while the works of
the Northeastern Steel Company are now be-
ing pushed actively on to completion. Thus
it may be fairly hoped that the Northeast
has become one of the chief of the steel rail-
producing districts; and that in the early
future it will give its energies to the produc-
tion of steel plates and other forms of the
metal that are almost certain to become in-
creasingly used in a district that is one of the
chief centers of the shipbuilding industry.

The Cedar Rapids *Republican* says: "Prob-
ably the largest plate casting ever made in
Iowa has just been cast in the foundry of G.
B. St. John. It is to be the main landing of
the iron staircase he is building for the new
Presbyterian Church at Vinton, and is 6 feet
4 inches wide by 13 feet 8 inches in length.
The entire surface on one side is furrowed
into diamonds about half an inch in width,
and the thickness of the whole plate is only
eleven-sixteenths of an inch, decreasing at
the edge to one-fourth of an inch."

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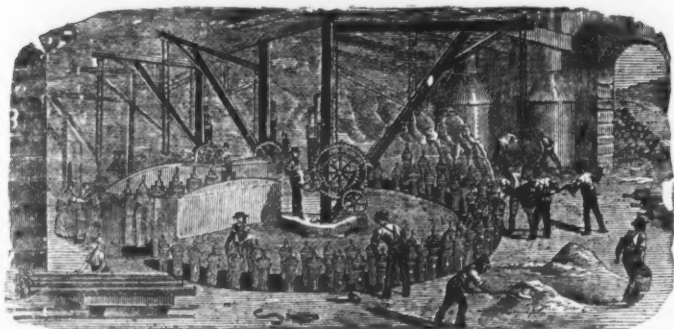
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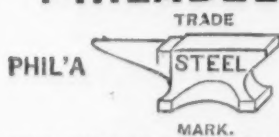
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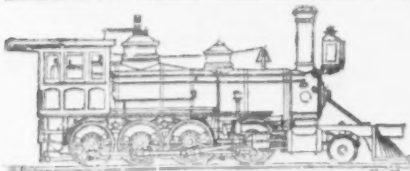
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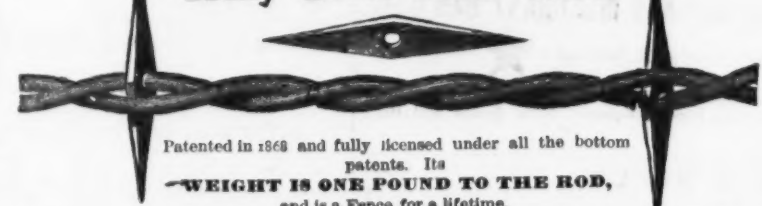
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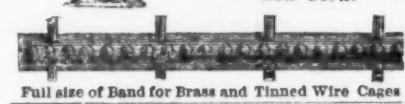
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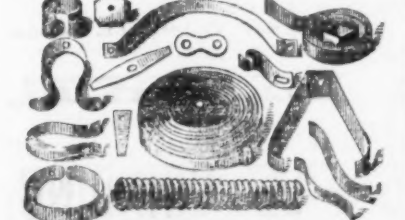


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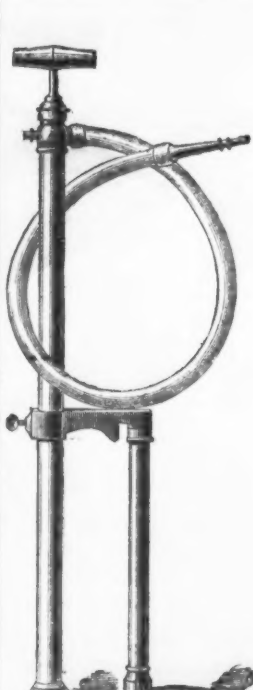
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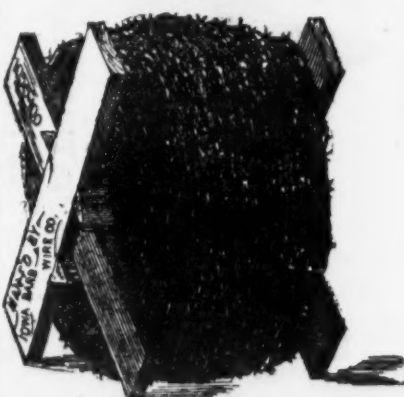
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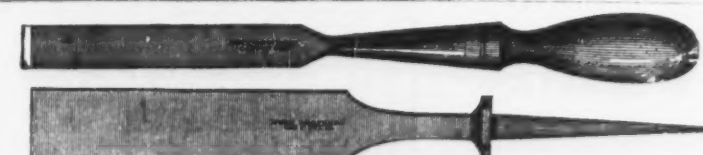
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Indicator trials, such as are at the present time frequently conducted in connection with steam engines, have been rarely applied to test the working of pumps. A great number of these, and even such of large water works, have been subjected to indicator tests only in exceptional cases, and it is but of late that the results of such trials have been considered with due attention and recognized as the basis of all future improvements in the construction and economical working of pumps. No department of engineering can boast of more proposed and practically-tested improvements than that of pump construction, and probably much of the time, skill and labor, in many instances spent without apparent success, could have been more profitably employed had indicator trials been previously resorted to. These should be conducted in a thorough manner, since by their aid alone can the causes of frequent disturbances in the action of pumps be detected. Such trials expose faulty construction and irregularities of action, and show that different modifications of valves often differ in behavior from what is generally supposed to be true. Many forms adopted with expectations of good results give anything but the desired effect. In a recent publication of "Indicator Trials of Pumps" by Mr. A. Riedler, of Munich, Germany, previously mentioned in these columns, the author dwells upon all the vital questions of pump construction, and gives a number of indicator diagrams which are highly interesting and instructive. Mr. Riedler used in his tests two indicators, one of which was a Thompson indicator, and the other a modification of it introduced by himself. In order to avoid the errors resulting from the imperfections of very stiff springs when experimenting with high pressures, he reduced the piston area of the indicator in proportion to the increase of pressure, this method yielding satisfactory results with pressures as high as 200 atmospheres. Mr. Riedler presents in his publication a number of trials of pumps in German mines, with the results obtained, which, however, are too numerous to give here. In regard to pump valves, the author states that one of the essential requirements is a reliable closing or opening at each change of stroke. Shocks in pumps, when produced by the valves, are generally attributed to the improper functions of the pressure valves, although it may be shown that they result directly from the suction-valves. When the latter are open and the stroke is reversed, it sometimes happens that on account of insufficient weight of the valves they do not close promptly, but remain open until a portion of the return stroke has been passed over. The consequence is that when the valves do close a shock is experienced, the violence of which depends upon the velocity of the column of water at the time of closing. The presence of air in pumps has also the tendency to produce shocks, since the air must first be compressed before the water column is acted upon. The pressure valves, therefore, open only after a portion of the stroke has been passed over, and the velocity of the water must suddenly be accelerated until it is equal to that of the descending piston. Pumps should therefore be made perfectly air-tight, and it is only in pumps of faulty construction that air is sometimes attributed to cause smoothness of action. The indicator diagrams obtained from such pumps clearly show the presence of air. It sometimes happens that the cylinders of pumps of which the lower end of the suction pipe has been above water, are filled with air, and indicator diagrams obtained from such pumps are, in many respects, similar to those obtained from air compressors. In regard to the piston speed of pumps, it may be said that formerly 1 foot per second was considered as the limit, the idea prevailing that high velocity caused frequent shocks and other disturbances. There is, however, in theory no reason why pumps should not be worked at high speeds. Of course many difficulties will have to be overcome, and pumps will have to be improved in many respects before this end can be attained. It is stated that high piston speed is less objectionable than a great number of successive strokes, and consequently valves of large area, short travel and great weight are recommended. Such valves, when fitted to high-speed steam pumps (200 revolutions per minute) have given entire satisfaction. Mr. Riedler expresses the opinion that the future of pump construction depends greatly upon the question of high piston speed. If it were possible to obtain a satisfactory working of the valves at speed equal to those of present high-speed steam engines, many of the defects of our present slow-working pumps would be removed and considerable advantages gained, which have not yet been applied in pump construction. The successful introduction of high-speed pumping engines in Bohemian and Silesian districts show the superior advantage which such engines possess. In these cases large valves of great weight are entirely dispensed with and small valves have been substituted which seem to work very well. The adoption of such valves will insure success even in pumps of poor construction. Indicator diagrams obtained by Mr. Riedler, showing the variations of pressure when pumps were working slowly, are very interesting. In connection with an experiment at the "Amalienschaft," in Kladno, Germany, it was found that when four pumps were in operation, delivering water into one delivery pipe, the diagram showed lines of uniform pressure, different speeds of piston producing no variations whatever. When, however, only two of the pumps were in operation, two with low speeds a gradual increase of pressure was observed, increasing in proportion as the speed decreased. With a somewhat higher speed no variations were observed, the pressure remaining uniform. The motion of the water column may probably serve to explain these phenomena, for, when working rapidly its motion is more uniform than when working slowly, due to the varying influence of the air chamber. Mr. Riedler repeated these trials several times and obtained corresponding results on each occasion. Previous trials showed considerable variations of pressure with less than 25 revolutions, while uniformity was maintained at higher speeds. Recent experiments

with more perfect instruments gave similar results. The pressure line was generally straight at 20 or more revolutions, while variations occurred when the speed varied from 12 to 10 variations. Mr. Riedler also obtained indicator cards from the delivery pipe and air chamber, and his results and conclusions are exceedingly interesting, so much so that we shall feel justified in giving a more complete account at no distant date.

English Imitations of American Axes.

The *Ironmonger* says: The recent reflections made in the *Ironmonger* upon English axes for the colonies in connection with American competition, seem to have drawn the attention of more than one Sheffield firm to our position in this matter, and to the importance of entering the lists with American makers on something like the same basis. At all events there is undeniably a determination to use every effort to cut out the manufacturers of the United States in the important Australian markets, and attention is being devoted to three points, in two, at least, of which it is asserted that our competitors can claim the preference. These are price, quality and finish. With respect to the quality, there can be no doubt that English firms are thoroughly safe, but with regard to quotations and finish, they have, possibly, something to achieve, and, as we have said, the attention that has been recently bestowed upon the question promises to bear the best results. We saw to-day, at the works of a well-known local firm, a wedge ax made exactly on the American pattern, combining the maximum of power with the minimum of weight, and finished off to an unsurpassable nicety. This ax, notwithstanding that the firm has to obtain the hickory handles from across the Atlantic, is going into the Canadian markets, and even into the States themselves, in both of which the wedge ax of American houses has hitherto reigned supreme. This evidence of a far-seeing and enlightened policy will be very pleasing to Englishmen, who have been irritated by the inroads America has made upon our specialties. The wedge ax differs materially from the ordinary English felling-ax. This is due to the difference between the systems of felling here and in the backwoods across the water. Here the woodman strikes at the base of the trunk, and consequently requires a blade that will take out his limited reach without losing any of his power. The blade, therefore, is more than double the length of the American wedge ax, and narrow in proportion to its length. The backwoodsman severs his tree at a point some 3 feet from the ground, and therefore wants an implement better adapted to a rectangular stroke. The ax popular in Australia is a sort of compromise between these, and in this ax, also, the firm in question have determined to do their best to out the American makes. They have now a representative well on his way to the Southern Continent, and they hope he will do something to prepare the way for practical enterprise. When the hardware trade of Australia was in the hands of the Jewish clothiers, and all sorts of rubbish were palmed off upon the settlers, the English manufacturers sustained a blow from which, in some respects, they have not yet recovered. Assiduous "nursing," good workmanship, fair prices and popular patterns now render the prospects of our heavy hardware firms fairly promising, and before long we may hope to see the English ax a favorite tool in the colony.

Reflected Electric Light.—The experiments which have been conducted on board the *Sultan* at Portsmouth, England, with a view of ascertaining whether the electric search lights in men-of-war could be protected from the guns of torpedo boats by the adoption of reflected light under cover, have been concluded. The official trial was witnessed by officers from the Admiralty and the War Department and from the local Torpedo School. Four different kinds of lenses were tested for purposes of comparison, the intensity of the electric beam being measured by a Bunsen photometer and one of Sugg's burners. The apparatus used were a dioptric lens, a catoptric lens 90 cm. in diameter, the ordinary above-board ship's glass, which was similar in character, but only 60 cm. in diameter, and a reflector made of Chance's glass and silvered. The respective merits of each were found to be in the order mentioned, the dioptric producing double the illuminating power of the next best, and with an appreciable economy in cost.

An Austrian engineer writes to the *Austrian Railroad Journal* of the "fireless locomotive," which, as the *Railroad Gazette* remarks, is our old New Orleans friend invented by Dr. Lamm, and improved by a French engineer, Franque. It appears that a Paris suburban street line is fully equipped with them, and has been worked with them for four years. The road is six miles long, from Rueil to Marly-le-Roi, and at one end there is a very steep grade for nearly 1 1/2 miles. The locomotives weigh 18,000 pounds in service, and are said to be of 16 horsepower. As far as the foot of the steep grade they take four cars of passengers at a speed of 9 to 12 1/2 miles per hour, the whole weighing 31,000 pounds, and they run 9 miles with a single charge of the boiler. Up the steep grade, at the foot of which the engines are charged, the engine usually pushes one, but sometimes two cars. There are 31 boiler charges made daily, and the fuel required is reported to be 35,000 pounds of "briquettes" for this service. Five of the fireless locomotives are employed, and the two ordinary locomotives used originally are now kept as reserve engines. The entire expense of the six miles of road is about \$28,000 a year; its earnings, \$72,000. It serves exclusively for passenger traffic, and the fares on it are low.

A great blast, which has been preparing for nearly a year at the limestone quarry of the Glendon Iron Company, near Easton, Pa., was fired recently. Four tunnels, each 50 feet long, were run into the hillside, and at their end two chambers were built at right angles, each 8 feet long. Ten tons of powder were used, and upon igniting the charge 40,000 tons of rock were dislodged.

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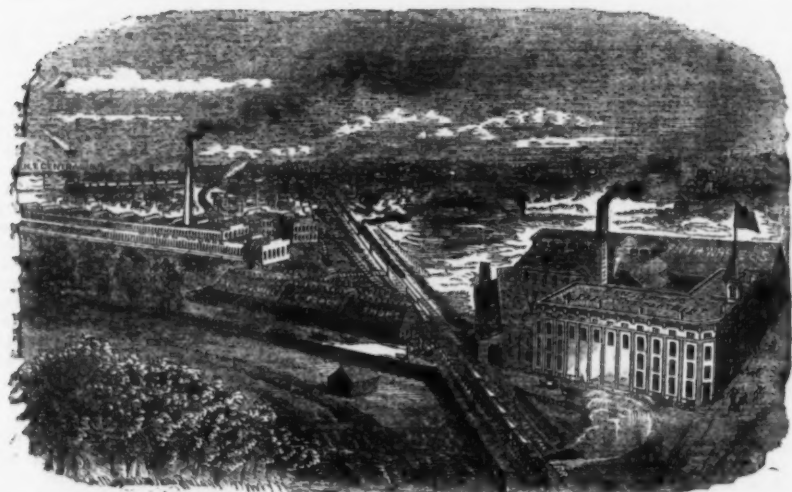
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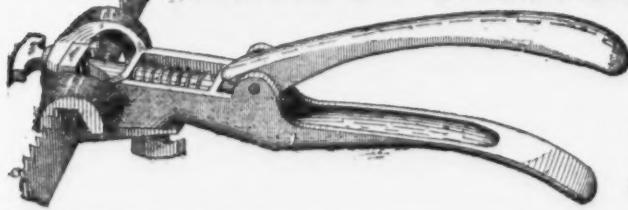
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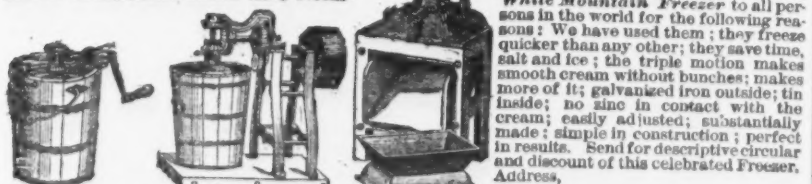
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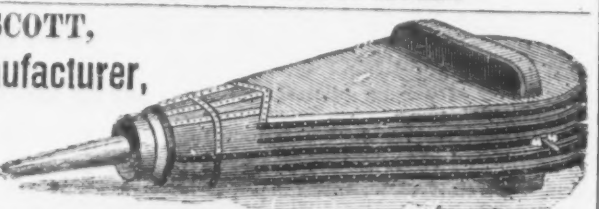


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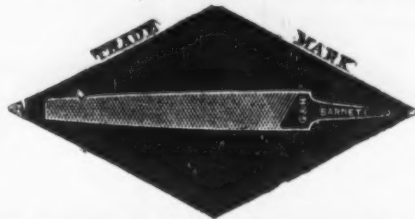
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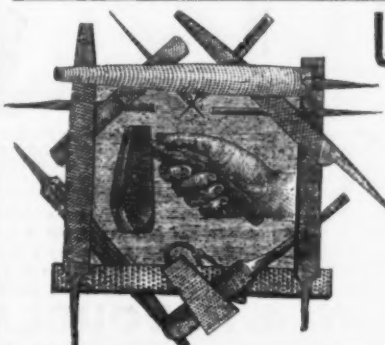
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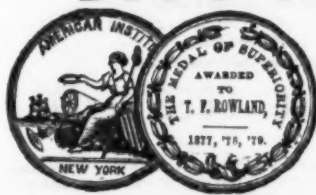
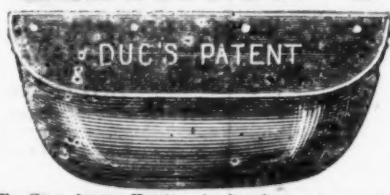
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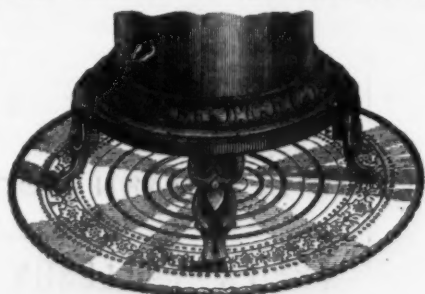
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SCIENTIFIC AND TECHNICAL.

Mr. Egmond J. Erichsen, of Copenhagen, has recently perfected an invention relating to a

NEW APPLICATION OF ASBESTOS,
according to which pulverized asbestos, in a raw state or otherwise, is so combined with various silicious solutions and with metallic or other colors, as to produce new materials or compositions which partake of the nature of stone or enamel, being hard, dense, resisting oxidation, and heat, cold and dampness. Applied as a paint, it forms a fire-proof enamel, resisting the influence of oxidation of iron coated therewith and the influence of white heat; for porous fire-proof materials it serves to give a glassy surface, stopping the pores. It is applicable as a coating for building materials, such as stone, newly faced or decaying or ornamented, or plain, and cement castings and concrete; also for wood, for gas and water pipes inside and outside, for roofing felts and asphalt roofing materials, for roofing of iron and other metals, for the inside and outside of wooden and iron ships, and for brickwork to resist damp and atmospheric influences. It is further suggested that the material is specially applicable to the protecting of the inside and outside parts of steam boilers exposed to the injurious effects of fire and air. Brick walls and wood articles to be coated with the new material must first be cleaned with water and soap, and then be rubbed in with a thin solution of silicate of potash 10° Baumé, so that it enters the pores. This impregnation should be done twice, with an hour between, but not in frosty weather, before the walls, bricks and wood articles are covered with the paint. White walls and ceilings may be covered with paper, which is then coated with the paint. The walls and ceilings so covered and coated can be washed with water whenever required to be cleaned. For coating boilers externally to prevent radiation of heat, a composition is made of asbestos fiber and silicate solution of 25° Baumé. It is made as a thick dough, and if put directly on the boiler in a layer about 1/4 inch thick it will harden quickly. It is preferable, however, to make a framework of hoop iron to suit the shape of the boiler surfaces, say about 3/4 or 1 inch wide, and with 2 to 4 inches square open spaces between, and having pegs standing out about 3/4 or 1 inch. This framework, when covered with the material mentioned, may be removed from the boiler whenever it is desired, without breaking the coating to pieces. It will be observed that the great recommendation of the invention is that non-fibrous asbestos, which has hitherto been comparatively unmarketable, will acquire a permanent commercial value.

The Bulletin du Ministère des Travaux Publics recently described a series of experiments conducted by officers of the Ponts et Chaussées Administration, Paris, for ascertaining

THE RESISTING POWER OF BROKEN STONE
employed in making and repairing roads. These experiments were directed toward two objects, to ascertain the resistance of different classes of stone to wear and to shock, and their resistance to crushing. The crushing tests were made in the ordinary way, but to obtain the comparative resistance to wear, &c., a standard of comparison was employed, the stone being submitted to treatment in a testing machine consisting of two groups of four cylinders each; these are mounted, side by side, on a bent frame, terminating in horizontal shafts, at one end of one group of which are mounted pulleys and gearing, in order to transmit motion to the other group. The distance of these shafts is 16 inches, and the cylinders are about 7 1/2 inches in diameter and 14 inches long. In one of these chambers is placed a standard sample of porphyry, and in the other the stone to be tested; the charge averages about 11 pounds. The machine is driven with a speed of about 2000 revolutions an hour, and the stones are subjected to attrition, and also to a to-and-fro motion from end to end of the cylinder. After about five hours the cylinders are emptied and their contents are carefully washed, the fragments precipitated being divided by sifting into three classes—those which will not pass through openings 0.39 inches in diameter, those decreasing from this size to 0.07 inches and the dust smaller than 0.07 inches. The first portion is returned to the stone being tested, and the third is weighed, the relation it bears to the original charge indicating the value of the material tested. Experiments showed that the best samples yielded 2 per cent of their weight in dust.

Frank W. Clark, of Westminster, England, has patented an

APPARATUS FOR REGULATING THE PRESSURE OF GASES,

the arrangement being as follows: In a receiver of cylindrical or other suitable section a vessel of similar shape is placed, reacting nearly to the bottom. A space left between the two vessels contains a small quantity of mercury. The inner vessel is provided with a heavy plunger, the rod of which passes through the cover of the apparatus, and is connected by means of a link or lever with a valve in the inlet pipe. The outlet pipe communicates with the receiver, and the outer circumference of the inner vessel is supplied with a flange, in order to prevent the mercury from splashing. The gas, when entering through the inlet valve at very high pressure will, by means of the communication between the outlet pipe and the receiver, press on the surface of the mercury in the space between the two receivers and force it into the inner vessel. The plunger is thereby raised, and consequently, closes or partly closes the valve, so as to reduce the pressure. If the latter falls below the required degree, the plunger falls and opens the valve. The two concentric receivers here described may be arranged side by side, or otherwise if preferred.

The following process has been patented for the

CONVERSION OF ORDINARY AGATE INTO ONYX.
The dressed stones are first placed into nitric acid, to extract the compounds of iron and other metals, and are then dried and calcined to remove the remnants of nitric acid. Having done this they are soaked in a solution of 220 grains of caustic potash or soda

in one liter of water until saturated, and are finally washed in water. By placing them again in nitric acid and washing, the alkali is removed from the outer surface of the stones, after which they are dried and thoroughly calcined. The stones thus treated are completely bleached and white, while their outsides are rendered porous, so that they can absorb coloring solutions, which gradually shade off into white, as in natural onyx.

Mr. Charles E. Emery, of New York, recently made some

EXPERIMENTS UPON RELATIVE NON-CONDUCTIVITY,

with reference to the needs of the New York Steam Company. His apparatus consisted of a boiler 12 feet long and 4 feet in diameter, with three 10-inch flues passing through it. Inside these flues were smaller tubes, through which the steam passed. The non-conductors surrounded the inner tubes, and water was kept circulating around the flues in the outer shell. A layer of hair felt 2 inches thick gave the best result, and, using equal thicknesses of the other materials, the following results were obtained:

Material.	For cost.	Non-conductivity.
Hair felt.....	100.	100.
Mineral wool, No. 2.....	83.2	83.2
Mineral wool, No. 2 and tar.....	71.5	71.5
Sawdust.....	68.	68.
Mineral wool, No. 1.....	67.6	67.6
Charcoal.....	61.2	61.2
Pine wood, across grain.....	55.3	55.3
Loam.....	55.	55.
Gas works lime, slaked.....	48.	48.
Asbestos.....	36.1	36.1
Coal ashes.....	34.5	34.5
Fuel coke.....	27.7	27.7
Air space, 2 inches deep.....	13.6	13.6

The low result from air space no doubt is due to the unimpeded circulation of the currents.

Some years ago Mr. Garrett, of England, designed and built

A SUBMARINE TORPEDO BOAT

which was propelled by manual power. In the autumn of 1879 a second boat was constructed, one of its leading features being the means of propulsion under water, which was attained by having a very large steam boiler carrying a pressure of 150 pounds per square inch, this pressure being utilized after the fire was closely shut up and combustion stopped. From experiments which were carefully made, there is no doubt that the vessel was capable of being propelled under water a distance of about twelve miles, simply by getting a full head of steam with the aid of the blower before diving below the surface, after which it was necessary to shut up the fire-door and chimney, and then go on utilizing the latent heat, evaporating the water contained in the boiler just on the same principle as that adopted in Lamin's fireless locomotive, until its exhaustion would compel a return to the surface to blow up the fire again and recharge the boiler with water. Owing to the untimely loss of the vessel off the Welsh coast, it is to be regretted that experiments in keeping up the furnace heat when the boat was submerged were not completed. One of the leading features of this vessel was that when sailing below the surface there was no track whatever to trace her course through the water. The boat was managed by three men, and it was found that if one man in the conning tower had the secret breathing apparatus in use, the air of the boat was kept in a fit state for the other men to look after the management of the machinery. The engine was of the return connecting-rod type, and was fitted with a surface condenser. The side rudders for submerging the vessel were worked from the conning tower, but their action was not fully experimented upon. The mechanical details of a perfect submarine boat would seem to be capable of a satisfactory solution, but the question of navigating such a vessel is still a matter of grave uncertainty.

It may be interesting to present some results of observations made at the Royal Observatory and at the Botanic Gardens of London, concerning the

TEMPERATURE OF THE SOIL.

The temperature of the ground surface is almost entirely dependent on the heat of the sun, and is therefore always greater in the daytime than at night. Considering all the circumstances which affect the temperature of the ground, there must be included the kind of exposure of the surface, the nature of the soil, the permeability of the ground by rain and the presence of underground springs, the sun's declination, the elevation above the sea, and the amount of cloud and sunshine. The temperature of the soil is observed at the Royal Botanic Gardens, London, three times daily at depths of 3 inches, 6 inches, 12 inches, 24 inches and 48 inches. The underground thermometers used are considered better than any previously made. A series of observations made with unfailing regularity, extending over six years, have been discussed by G. J. Symons, F. R. S., with some interesting results. The mean temperature of the air at 4 feet above the soil, and that of the surface of the lake, which covers more than an acre of ground, have also been deduced for the same period. The lowest mean monthly temperature under the various relations to the surface of the earth are:

	At 9 a. m.	At 3 p. m.	At 9 p. m.
Air at 4 feet.....	Deg. 58.9	Deg. 42.1	Deg. 40.0
Surface of lake.....	59.7	40.7	40.2
3 in. below grass.....	37.3	39.4	37.9
6 in. below grass.....	38.2	39.0	38.8
12 in. below grass.....	38.2	38.3	38.3
24 in. below grass.....	39.5	39.4	39.4
48 in. below grass.....	41.0	41.6	41.6

For the highest mean monthly temperatures we have the following results:

	At 9 a. m.	At 3 p. m.	At 9 p. m.
Air at 4 ft. above the soil.....	Deg. 64.8	Deg. 71.3	Deg. 68.0
Surface of lake.....	66.3	70.1	68.4
3 in. below grass.....	64.9	75.0	67.3
6 in. below grass.....	63.4	70.4	66.3
12 in. below grass.....	63.6	64.8	65.9
24 in. below grass.....	66.1	62.0	61.9
48 in. below grass.....	66.5	60.5	60.5

These maxima mean temperatures occur in July, except those at 2 feet and 4 feet, which fall in August. At this the hottest portion of the year the temperature of the air is on the whole slightly below that of the water, but it has a greater diurnal range. The temperature of the soil is greater than that of the air only at the surface; it decreases

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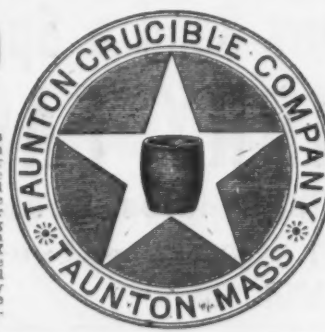
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(See Iron Age first issue of each month).

with the depth, and at 2 feet the diurnal range ceases. The results of the earth temperature observations made at the Royal Observatory during the years 1847 and 1873 are given in the "Greenwich Meteorological Reductions." Referred to noon as the time of observation the lowest mean monthly temperature of the series are for the

Air..... 38.4° in January.
At 1 inch below soil..... 40.9° in January.
At 38.4 inches below soil..... 47.7° in February.
At 75.8 inches below soil..... 47.8° in March.
At 151.6 inches below soil..... 45.4° in April.
At 307.2 inches below soil..... 48.9° in June.

Similarly the highest mean monthly temperatures are:

Air..... 62.5° in July.
At 1 inch below soil..... 65.4° in July.
At 38.4 inches below soil..... 62.5° in August.
At 75.8 inches below soil..... 59.6° in August.
At 151.6 inches below soil..... 55.8° in September.
At 307.2 inches below soil..... 52.2° in November.

It thus appears that whereas the coldest temperature of the air is in January, the wave of cold (if it may be so called) travels slowly downward and does not reach 25 feet until June, and that whereas the hottest temperature of the air is in July, the wave of heat travels slowly downward, and does not reach 25 feet until November. At that depth the temperature decreases until June, then increases until November, whereas the thermometer bulb, covered by only 1 inch of soil, reaches its lowest and highest limits about the same time as the thermometer in air, shaded, and 4 feet above the ground. The retardation of cooling and of heating is greater the deeper the soil, though the yearly range decreases as the depth increases, down to the stratum of invariable temperature. The non-periodic fluctuations of cold and of heat which affect the air are not felt perceptibly beneath the surface of the ground.

A short time ago M. Marcel Deprez devised a simple graphical method of

CALCULATING DYNAMO-ELECTRIC CURRENTS

for any speed of working of the machines, and for any resistance of the external circuit.

The method consists in drawing what M. Deprez calls a "characteristic" curve for each machine, this being done by disconnecting the ring or armature coil from the electro-

magnets, and sending a current of known strength from a foreign source through these, and then revolving the ring at an alternating but constant speed. The difference of potential between the two ends of the ring is measured in the usual way. The current in the electro-

magnets is then varied, and the corresponding variations of the electro-motive force of the ring are measured. By taking the intensities of the exciting current for abscissae and the electro-motive force of the induced current for ordinates, the characteristic curve is drawn. In the Gramme and like machines this electro-motive force is proportional to the speed of rotation of the ring.

The connection between the ring and electro-magnets is next to be re-established, and the circuit of the machine closed by a wire of any resistance whatever. The foreign current is now, of course, withdrawn, and the machine is in its ordinary working condition. Provided the total resistance of the circuit is known, the intensity of the auxiliary current can be at once determined from the characteristic curve. For let I be the intensity of this current; E, electro-motive force of the ring when open for a speed of unity; R the total resistance of the machine circuit, including that of ring, magnets and external work, and W the angular velocity of the ring, we have $I = \frac{WE}{R}$ and $\frac{I}{E} = \frac{W}{R}$; but $\frac{I}{E}$ is the

coefficient of inclination of a line passing through the origin, and since it should be equal to $\frac{W}{R}$, we can find the intensity of the current by drawing through the origin of the characteristic curve a straight line whose coefficient of inclination is proportional to $\frac{W}{R}$.

The point of intersection of this line with the curve will have for its abscissae the intensity of current sought, and for ordinate the generating electro-motive force of the current.

The Iron Trade of Scotland.

The *Corry Guardian*, in a review of the iron and coal trades of Scotland, says that at no time during the course of the Scottish iron trade has there been any great excitement in the market. The business has for the most part proceeded in an even, quiet and steady manner, and transactions have apparently been conducted upon a very sound basis. The year 1881 opened with a very hopeful feeling in the market, due chiefly to the fact that when the annual returns were published at Christmas, it was found that instead of an increase in the stocks of pig iron in makers' hands, an actual decrease of about 6000 tons, as compared with the private stocks of the previous year, had taken place. Great expectations were also formed regarding the probable extent of the American demand, and some speculation took place in the early part of January on this account. Shortly afterward information was obtained concerning the great extension of iron works in America, showing that the people of the United States were making successful efforts to produce their own iron, and thus be independent of importation. These causes produced a weakness in the market, continuing, with slight variations, during the spring and summer. At the same time the Continental demand was growing and becoming more satisfactory than in former years, and the rapid development in the Scotch shipbuilding trade brought into the market heavy contracts from the makers of malleable iron, and from the foundries.

Such was the state of affairs when the proposal emanated from the Cleveland ironmasters that the number of furnaces producing pig iron should be reduced. From a variety of causes this proposal was not at first entertained, but as the weeks proceeded it became more and more evident that the stocks of pig iron were growing unwieldy, and that if the output was not curtailed they would be likely to operate unfavorably with reference to prices. In the month of August the expedient of reducing the production was again brought under consideration, and a conference of Scotch and Cleveland ironmasters took place at Carlisle, with the result that an agreement was drawn up, binding both parties to extinguish a certain proportion of furnaces during a period of six

months, from the 1st of October, 1881, to the 31st of March, 1882. In pursuance of this agreement the Scotch ironmasters damped out sixteen blast furnaces in the beginning of October. The effect of this was to reduce the weekly output by about 3200 tons. But although there are close upon 40,000 tons less pig iron now than there would have been if this damping process had not been resorted to, it has not produced the good effects which were expected of it. Immediately after the agreement was entered into, early in August the prices of warrants began to advance. By the time the furnaces were actually put out, therefore, the influence of the step was almost fully discounted, and when in a few weeks afterward it was seen that the deliveries into store, instead of diminishing, were really increasing, a reaction in prices set in, and the quotations until the present have been moderate in extent.

Notwithstanding the extinction of sixteen furnaces during the past three months the total production of pig has considerably exceeded that of last year. Up till the autumn the imports of Cleveland iron were steadily increasing, owing to the great demand at the manufactured iron works. There was at one time an increase of as much as 60,000 tons in these imports. This increase has since, by smaller weekly arrivals, been reduced by about one-half. The explanation of this circumstance is doubtless found in the fact that Scotch ironmasters, not finding a very ready market for their iron abroad, have been selling out to owners of the malleable works, either directly or through brokers, on very moderate terms. The question whether the Scotch or Cleveland foundry and forge iron should be employed is, to a great degree, one of the difference in prices. The Scotch iron, it need hardly be said, is of superior quality, and when the prices are only a little above those of Middlesbrough plus the cost of freight and transit, manufacturers naturally prefer to use a larger quantity of Scotch iron. As a consequence, the consumption in foundries and in malleable and steel works has been larger than it was last year. But the advantage gained in this way has been lost by a decline in the foreign exports, which have fallen off to the extent of about 93,000 tons as compared with those of 1880, and there still remains unsolved the difficult problem of what is to be done with the heavy stocks. There is no doubt whatever that, while they have tended to keep down prices and prevented ironmaster and merchant from making such large profits as they would have liked, they have operated most beneficially in checking pure speculation and in promoting a feeling of confidence throughout the different branches of the iron trade. It is largely due to the existence of heavy stocks and the consequent moderation in prices that the different branches of the manufactured-iron trade have experienced so gratifying a development. These latter works have, particularly during the closing months of the year, been exceptionally busy, and their prospects at the present time are very cheering. We must not omit to notice the great advance which has taken place during the year in the steel industry in Scotland. The works formerly existing have had their capacity of production almost doubled. Three large establishments for making steel have been added in Glasgow and its neighborhood, and just now there are two additional works in course of erection on the Clyde. The works which have been going have produced large quantities of plates for our shipbuilding and marine engineering trades, particularly the former, rails and blooms and a variety of manufactured articles for abroad. The use of mild steel in shipbuilding has advanced very considerably, and altogether the prospects of the steel trade are very satisfactory.

About three months ago the New York stockholders of the Keely Motor Company went to Philadelphia and declared that unless Mr. Keely should reveal to them the secret of his motor they would carry the matter into court and there compel him to tell how he acquired the power which he used to run the engine. When the facts were made known to Mr. Keely he refused to divulge his secret, and the result was that a bill in equity was filed against him last week. Through his counsel, Mr. Joshua Pusey, Mr. Keely filed a demurrer to the proceedings, in which he states at length his reasons for not revealing his secret. He avers that it is not his desire to defraud any of the complainants, and that he will patent his inventions when he has completed them.

Concerning the Continental iron trade, the *Moniteur des Intérêts Matériels* calls attention to a circumstance which indicates that, while there are good prospects that the market will slowly and steadily improve, it would be a mistake to anticipate any very considerable advance in prices. A contract for 14,000 tons of steel rails for the North of Spain railways, for delivery during the course of the next three years, has just been taken at the Krupp Works, at a price equivalent to a fraction over \$32 per ton, delivered free at Santander. Nobody but the protected manufacturer at Essen would have thought of taking such an order at so low a price.

After a cruise of a few months in the South Pacific Ocean, a French man-of-war was recently found to have specimens of living coral growing upon her hull, which interesting discovery has thrown some light on the question of the rapidity of growth of corals. The evidence tends to show that the vessel on passing a reef of the Gambier Islands, against which it rubbed, had picked up a young fungus, which adhered to the sheathing of the ship, and grew to the size and weight it had when observed—a diameter of 9 inches and a weight of 2½ pounds—in nine weeks.

Pittsburgh coal consumers are considerably agitated over the fact that Pittsburgh coal is selling in the ports of Cincinnati and Louisville at as low a price per bushel as is asked for it in Pittsburgh. The dealers say that the abundant floods of this winter have allowed the shipment of so much coal to other ports that the market is overstocked,

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Phosphor-Bronze is daily gaining favor with manufacturers who have to use a metal of great toughness and durability, of fine grain, high tensile strength and ductility, and is acknowledged far superior to any other alloy on account of the readiness with which it takes a polish, its elasticity, fluidity and beauty of color. Its high price, however, has so far prevented the use of it to so large an extent as its merit would warrant. For the first time an article is offered herewith which makes it easy for everybody to manufacture his own Phosphor-Bronze of the grade it is wanted, by the simple process of melting. This article is **PHOSPHOR-TIN**. By melting a very small quantity of it with copper an excellent Phosphor-Bronze is obtained at a much cheaper price than the ready made Phosphor-Bronze can be had in the market. A trial ought to be made by everybody who is using it.

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If you doubt that it can be done, just step into Barnum's
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bell every time through a quarter-inch bull's eye, or shoot
the ashes from a cigar held in another person's mouth and
many other wonderful shots.
We add a couple of testimonials out of a large number
we have received so far this month.

J. STEVENS & Co.—Gents: Enclose I find draft for bill.
The rifle just made for me gives entire satisfaction so far as
appearances go to make a perfect gun. It is the finest bal-
anced gun ever yet brought here. I have not tested it yet,
but feel satisfied it will shoot as well as it holds, as all the
other ones have. Yours truly,
H. H. BURNES.

STANLEY, Ark., Nov. 6, 1881.
Gentlemen: I went out on the 21st of October with a
Stevens 24 in. 32 calibre rifle, and killed five wild turkeys,
and again on the 28th of October and killed six more, mak-
ing 11 in two days' hunting with the same little gun. I
killed one of them at 100 yards, and another at 120 yards,
and can kill one at 200 yard. I consider your rifles the
nearest, simplest, strongest and best gun in the market.
Yours,
R. F. BAKER,
Co. Examiner, White Co., Ark.

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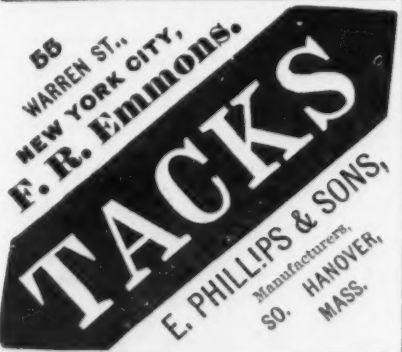
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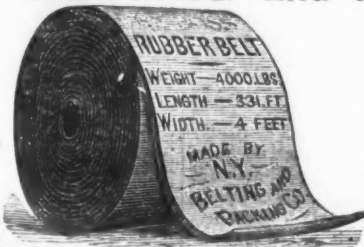
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Pat. 645, Pat. July, 1874.
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LINED "CABLE" HOSE and "TEST"
HOSE, Vulcanized Para Rubber and Carbolized Duck,
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The properties of these Wheels are such that they can be used with great advantage and economy
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Machinery of almost every description.

Pat. Jan. 26, 1866. Pat. Jan. 26, 1866.

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For Packing the Piston Rods & Valve Stems of Steam Engines & Pumps
B represents that part of the packing which, when in use, is in contact with the Piston rod.
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This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

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Pat. Jan. 26, 1866. Pat. July, 1870.

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This practical and indispensable article—
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PHOSPHOR-BRONZE.

The Tariff Agitation in Austria.

Mr. Weaver, the Consul-General of the
United States at Vienna, has transmitted to
the department a report on the proposed
protective duties on imports into Austria:

At the present moment there is being car-
ried on in this empire a vigorous discussion
in regard to the protection of home indus-
tries by means of increased entry duties. In
the early part of the year the chambers of
commerce had prepared and sent to the large
manufacturers of the country, soliciting
exhaustive replies, long lists of interroga-
tives relative to the condition of trade and
the effect of foreign competition. The gen-
eral result of the investigation and discus-
sion of the question by the press, industrial
societies and chambers of commerce warrant
us in expecting in the early future—probably
at the next session of the Reichsrath—an
effort on the part of manufacturers to have
their interests further protected by increas-
ing the duties on certain classes of importa-
tions in order to protect their domestic in-
dustries. Recently the subject has been
discussed in the Chamber of Commerce for
Lower Austria, in Vienna, where, according
to the report based on statistical information,
it was shown that for 1880 the importation of
pig and scrap iron amounted to 56,000 tons,
being one-sixth of the domestic production,
which was claimed to be excessive and dan-
gerous to the home interests, to obviate
which an increase of 70 kreutzers was
asked to be added to the present duty of
50 kreutzers per 100 kg. A similar con-
dition in regard to nearly all metal products
and manufactures, including machinery, lo-
comotives and wagons, was demonstrated,
and a similar remedy proposed.

In regard to the cotton-spinning industry,
it was shown that the 47 spinning factories,
with 581,000 spindles, in existence in Austria
proper in 1854 had diminished at present to
29 factories, with 406,464 spindles; that the
tariff of 1870 had produced little, if any,
benefit, and that while the average annual
importation of cotton yarn in Austria-Hungary
during 1876-80 amounted to over 21,-
000,000 florins, the exports for the same
period did not amount to 1,000,000 florins.
To remedy this it was proposed to increase
(about 50 per cent.) the present tariff from
6 to 20 florins per 100 kg. And as the same
unsatisfactory condition was claimed for
other yarns and textiles of every nature,
the same increase was likewise demanded for
these articles. It should not be understood
that opinion was by any means unanimous
that such a proposed remedy would be ef-
fectual, but while a contrary opinion was oc-
casionally raised and strongly argued, the
final outcome of the discussion was that the
resolution of the report to ask for increased
duties on these articles was carried by large
and important majorities, so that the matter
will almost certainly at an early day be
brought to the notice of Parliament. But as
the dual form of this government makes
every change of policy difficult, particularly
in respect to protective duties, to which
Hungary, as an almost exclusively agricul-
tural nation, strongly objects, as it taxes her
inhabitants for the benefit of Austrian man-
ufacturers, it is questionable if the design
of the protectionists will succeed, unless
after a hard battle and mutual concessions
to the Hungarians in other directions.

Electric Lighting in Sheffield.—Messrs.
Henry Bessemer & Co., of Sheffield, Eng-
land, have, within the last few weeks, lighted
the whole of their establishment on the
Brush system. A 16-light machine has been
found sufficient for the purpose, and the
lamps (nominally of 2000 candles each) are
distributed as follows: Four lights are dis-
tributed over the turning and fitting shops,
covering an area of nearly 12,000 square
feet. Three are in the forge, which has an
area of 11,250 square feet. Here it was
found necessary to suspend the lamps by
cotton cords, as the constant vibration in
the shop affected the regular action of the
lamps, by disorganizing the feed mechanism
of the carbons. In the tire mill, one light is
found sufficient, and one is also ample for
each of the converter houses. It is worth
remarking that during a blow the intense
light from the converters entirely eclipses
the light of the arc, which is then visible
only as a feeble glow. In the pattern shop
one light is also ample, the whitewashed
walls of this building reflecting the light
until it is as brilliant as average daylight.
The remaining four lights are distributed
over the yard, and here the contrast is per-
haps more striking than in any other part of
the works, the whole area being well
illuminated, and rendering work easy.

An Interesting Discovery.—M. J. Des-
sain, a French chemist, who has been for
years engaged in the study of oxygen and
ozone, finds that oxygen can be transformed
directly into ozone by the action of light.
The oxygen used in his experiments was
prepared from chlorate of potash and was
very pure. It was contained in a glass bell
jar, which, together with all the other vessels
employed, was coated with blackened paper
to exclude the light and keep the oxygen
dark. While in this condition the oxygen
had no action in the ozone test with which
it communicated; but when the rays from
an oxyhydrogen flame light were reflected
upon the bell jar so as to fall upon the gas
within for twenty-five minutes, the solution
of iodide of potash and amon used as an
ozone test became blue, and indicated the
presence of that substance. The discovery,
if it be sufficiently verified, will throw con-
siderable light on the physiological action of
solar radiation.

La Lumière Electrique describes a curious
application of electricity to prevent military
conscripts practicing fraud as to their stature
by bending their knees. When the conscript
stands erect against the measuring post the
hind parts of his knees press on electric con-
tacts, causing two bells to ring; the ringing
ceases when there is the least bending. The
sliding bar which furnishes the measure has
also a contact which is pressed by the head,
whereby a third electric bell is affected. For
a correct measurement the three bells should
ring simultaneously. This instrument is em-
ployed in the Spanish army.

Exports of Merchandise from New York
to Foreign Ports for the Year Ending
December 31, 1881.

In addition to tables already published, we
present the following, showing the quantity
and valuation of various articles of merchan-
dise exported from New York during the
year ended December 31, 1881:

	Quantity.	Value.
Mowers and reapers, No.	6,072	\$644,777
Plows and cultivators, No.	13,850	104,204
Agricultural implements, all other.	1,409,862	3,055
Bells and bell and bronze metal.	28,007	23,087
Brass and manufactures of.	1,055	636,704
Cars, railroad, No.	1,055	1,030,072
Clocks, and parts of.	64,814	264,290
Coal, anthracite, tons.	486	5,974
Coal, bituminous, tons.	113	1,279
Copper ore (112 lb), cwt.	7,039,534	1,136,419
Copper, pigs, bars, sheet and old.	67	48,576
Copper, other manufactures of.	3,111,197	41,848
Iron, pig, B.	1,684,399	19,419
Iron, railroad bars or rails, B.	900,922	23,087
Iron, other manufactured.	460,040	18,315
Iron car wheels.	9,584	98,089
Iron stoves and parts of.	9,584	98,089
Iron steam engines, locomotive.	60	387,150
No.	67	48,576
Iron steam engines, stationary.	67	48,576
Iron machinery.	5,147,877	176,039
Iron nails and spikes, B.	4,065,053	85,035
Iron, all other manufactures of.	1,035,794	3,347
Steel edge tools.	84,326	84,326
Steel files and saws.	437,594	437,594
Steel muskets, rifles, &c.	228,655	173,315
Steel, all other manufactures of.	89,110	39,105
of gold and silver.	1,901,579	94,537
Cartridges and fuses.	19,000	16,437
Quicksilver, lb.	1,395,197	116,484
Sewing machines.	94,537	94,537
Steam and other fire engines.	16,437	16,437
and apparatus.	1,395,197	116,484
Tin, manufactures of.	16,437	16,437
Zinc, ore and oxide, cwt.	1,395,197	116,484
Zinc, pig, B.	1,395,197	116,484

Between \$30,000,000 and \$40,000,000 of
petroleum has been shipped, about \$54,000,-
000 in wheat, \$22,000,000 in flour, \$19,000,-
000 in corn, \$30,000,000 in cotton, \$34,000,-
000 in bacon, \$14,000,000 in cheese, \$25,000,-
000 in lard and \$12,000,000 in tobacco.

NEW PUBLICATIONS.

SPON'S ENGINEERS' TABLES. By J. T. Hurst. Fourth
edition; 14 by 2 1/2 inches; 140 pages; in cloth
case. Price, 60 cents.

This little work consists of a series of
tables and memoranda for engineers, cover-
ing in a very small space much of the
ground usually found in the larger engineer-
ing handbooks. The number of tables and
the amount of information is very much
greater than it would appear possible to
place in so small a space. Among the lead-
ing subjects we have excavators' memo-
randa, bricklayers' memoranda and memo-
randa for slaters, carpenters and plasterers.
There is a chapter devoted to the smith and
foundry; another one devoted to the weight
of sheet lead, lead pipes, zinc and zinc nails,
&c. Mensuration, heights of the barometer,
dew points, girders and hydraulics also have
considerable space each. There is also a
chapter on weights and measures. The
pocket-book is inclosed in a small cloth case,
and, we think, is the smallest engineering
pocket-book ever issued. The tables and
data are all computed for use in England.

COMMERCIAL PRECEDENTS. By Charles Putzel and
H. A. Bahr. Published by the American Pub-
lishing Co. Bound in cloth. Price, \$3.

This work is a compilation of replies and
decisions on commercial matters selected from
the columns of the New York Journal of
Commerce, and is a convenient work of refer-
ence for business men generally. We have
not space to enter into a criticism of the
book, but will say that its general arrange-
ment and the character of its contents recom-
mend it to general perusal. While we should
take exception to some of the conclusions
reached, in the main the book is accurate and
contains much information. An alphabeti-
cally-arranged table of contents precedes the
work, while it is supplemented by a very
complete index. The subjects treated are
arranged under general heads, among which
may be mentioned assignments, banks, bills
of exchange, bookkeeping, brokerage, com-
mercial terms, corporations, employer and
employee, executions, freight, legates, in-
surance, judgments and executions, mort-
gages, taxation, trade-marks, wills, &c.

Cornish Pumping Engines.—According
to the London Mining Journal, the number
of Cornish pumping engines reported for
November, 1881, is 15. They have con-
sumed 1167 tons of coal, and lifted 7.8 million
tons of water 10 fathoms high. The average
duty of the whole is therefore 45,200,000
pounds lifted 1 foot high, by the consumption
of 112 pounds of coal. The following engines
have exceeded the average duty: Carn
Brea, 50 and 90 in., 46.7 millions; Dolcoath,
85 in., 54.5 millions; Mellanear, 76 in., 50.1
millions; West Basset (Thomas's 70 in.), 55.8
millions; West Tolgus (Richard's 70 in.),
47.9 millions; West Wheel Seton (Rule's 70
in.), 71.9 millions.

The Youngstown Register gives the follow-
ing on the authority of the miners, as the
daily product of the Mahoning Valley fur-
naces:

	Tons per day.
Hannah Furnace, Mahoning Valley Iron Co.	70
Struthers Furnace, Struthers Iron Co.	50
Andrews Furnace, No. 2, Andrews Bros. & Co.	100
Phoenix Furnace, Brown, Bonnell & Co.	65
Falcon Furnace, Brown, Bonnell & Co.	30
Eagle Furnace, Eagle Furnace Co.	30
Huron Furnace, No. 1 and 2, Huron Furnace Co.	90
Grace Furnace, Brier Hill Iron & Coal Co.	100
Brier Hill Furnace, Brier Hill Iron & Coal Co.	75
Spiegel Furnace, Brier Hill Iron & Coal Co.	45
Girard Furnace, Girard Iron Co.	35
Niles Furnace, Girard Iron Co.	35
Mary Furnace, Ohio Iron and Steel Co.	40
Total daily production.	845

The total amount of copper produced by
the mines of the world is estimated at 139,-
000 tons, of which the United States contrib-
utes 30,000 tons, while Chili leads with 45,000
tons, closely followed by Spain with a product
of 25,000 tons. It is not probable that the
discoveries of copper deposits that have been
and will be made, will be allowed to lie long
unimproved and undeveloped, and it will not
be unreasonable to expect to see this country
taking the lead in the production of copper,
as it already has as a producer of silver.
Judging from a history of the past, new de-
mands will more than keep pace with the
production of the future.

is easy of demonstration. A full appreciation of the true safe strength of the material cannot fail to call out a closer inquiry into the proper functions of safety factors—i. e., what they are intended to cover, and what they were never meant to cover.

There is no denying the fact that even at the present day there is in many minds a vague idea that safety factors are a sort of mechanical charity intended to cover a multitude of sins, both of omission and commission. In this may be found the reason for the deliberate overloading of many bridges designed years ago for the passage of locomotives and rolling stock such as were then in use; but since then the concentrated loads on drivers, weight of rolling stock and traffic have nearly doubled, yet such bridges are left in use to-day without any attempt at properly strengthening them for these increased loads. Nothing but misconception of the true margin of safety is chargeable with this neglect. For the same reason, tedious and sometimes difficult calculations of details and connections are often neglected in the first place by designers; "common practice" is blindly followed, without investigation as to whether it is properly applicable to the case in point, and any qualms of conscience are stifled with the answer, "Our factor of safety is sufficient." Manufacturers will use material not in accordance with specifications, and console themselves, and the inspector also, with the assurance that the safety factor is meant to cover just such deficiencies. Add to this the necessarily more or less imperfect workmanship—for structures like bridges, engines, boilers, &c., cannot be put together with the nicety to be found in an astronomical instrument—and it will be seen how easy it is to overburden the safe strength. Call it dealing in truisms to repeat here that the weakest point of a structure is the exponent of its strength, yet it will be safe to assert that this old maxim has not been quite as often uttered as it has been overlooked and disregarded.

If full and proper weight is given to the fact that the point of permanent set is the limit of the working capacity of the material, no matter how much more force may be required to produce rupture after that point is passed, and also that within that limit lies perfect safety, it cannot but lead to more rational methods of dimensioning than are at present generally adopted. With it will come a better understanding of the difference in the effects of live and dead loads, and, consequently, methods of dimensioning of the different parts of a structure in accordance not only with the amount of combined dead and live load, but also in accordance with the ratio between the dead and live loads they are meant to resist. This in turn must lead to the avoidance of superfluous weight—always detrimental to any structure—a more careful concentration of material along the line of strains, the better strengthening of details—especially connections—proper modifications of shapes and dimensions in those parts particularly subject to shocks, and last, but not least, a proper taking into account of the facilities of the manufacturer, which determine in a large measure the character of workmanship, and ought to influence the adoption of a lesser or greater margin of safety.

Our representative bridge works and machine shops have, more or less, for some time past adopted improved methods of proportioning and dimensioning, and are constantly experimenting and improving, but it must, on the other hand, be admitted that their number is limited and the amount of work turned out by them small in comparison to the immense production of structural work going on all over this country.

Factors of safety will always be needed, and therefore will always be provided in construction. But because we cannot, for instance, always provide against the phenomenal effects of hurricanes and tornadoes, this is no reason why perfectly calculable wind-pressures should be left out of consideration and be vaguely saddled upon the safety factor. Imperfections of material, however carefully selected, inspected and manufactured, will never be fully obviated; but this is no reason why material known to be flawed should ever be permitted to enter a structure on the plea that the factor of safety will cover the deficiency. Perfect workmanship is, of course, out of the question; but this is no reason for relying upon the safety factor to make up for positive carelessness and negligence in the shop. Let us hope that the near future will eradicate from all our structures bad proportions, bad connections, bad workmanship—in short, all that is ascribable to "trust in Providence and—a large factor of safety."

The establishment of a mint in New York is a topic more up for discussion, now that an enlargement of the Mint at Philadelphia is recommended as an absolute necessity. Moreover, a partial reconstruction of the Assay Office in New York is now receiving the attention of the Government architect, the building having been condemned as unsafe. Bullion dealers in Wall street have long ridiculed the folly of sending all the imported metals to Philadelphia for coinage, the needless expense thus incurred being fully \$80,000 per annum. One of the officials at the Assay Office remarks that the site of the property now used by them in this city is valued, on a trustworthy estimate, at \$1,000,000, or more than enough to provide ground and buildings for a mint establishment complete, in a location equally

good for mint purposes. The movement in favor of a new mint is in the hands of Congressman Waldo Hutchins. The necessities of the case may be judged from the fact that last year gold was shipped from New York to Philadelphia for coinage to the amount of \$75,716,234.

Some of the chief items of export in our trade with Mexico are manufactures, such as machinery, which increased last year to \$988,800, against \$365,200 in the year 1880, and the value of other iron goods increased in like proportion, or more than 50 per cent., from \$390,000 in 1880 to \$913,000 in 1882. The aggregate exports of 1880-81 were \$9,198,077, as against \$6,065,964 in 1879-80. This improvement is quite satisfactory, but the largest possible aggregate does not warrant the glowing portrayal of "the future of Mexico" sometimes indulged by writers for the newspaper press.

Shirking Contracts.

To the Editor of The Iron Age: I notice in a recent issue you advert to the unwillingness of manufacturers to book orders on an active market except at "price ruling at date of shipment," because of the tendency of jobbers to shirk contracts when the price declines. "Goods are refused on one pretext or another, as of poor quality, minor defects, &c., that would not have been noticed had the prices held firm."

There is some justice in the accusation, no doubt, and manufacturers have a right to protect themselves as best they can, but there is another side to the picture not so often presented. It is the difficulty jobbers have in getting their low-priced contracts and bona fide accepted orders filled when the market has advanced. Then the boot is on the other leg with a vengeance. The jobber who with foresight, or else with confidence enough to take the risk, laid his plans for an abundance of supplies, is cut off in his entreaties by terse assurances that it is impossible to get the raw material, that the men will not work, that foundations have given way or fly-wheels burst, that cars are not to be secured or that horses have the pinky. These are a few of the excuses he gets in response to feverish letters and imperative telegrams. Meanwhile, he learns of the immense product of the mill and knows that it is being distributed at more profitable figures. He is forced to enter the market and buy at advanced prices to fill orders for his customers taken freely in view of his large, low-priced stock. Finally, just as his high-priced stock coming in promptly enough has satisfied every requirement except that of furnishing a profit, when everybody is pretty well stocked, the season over and the demand off, then his good friends come down with the cheap-bought supplies and notify him generally to the following effect: "Having caught up with our orders, our books cleaned, we are now prepared to execute specifications on receipt of same. Hoping to receive your valued favors, which shall always receive our promptest and most careful attention, we are, &c."

I could sign appropriately several names to the above extract, but I fear other Western jobbers might recognize them. Of course there is the remedy at law, if anybody is fond enough of it to take it for a few hundred dollars. The explanation of the trouble complained of on both sides lies in the weakness of human nature. There is a strong disinclination to make losses or lose profits where either can be avoided. There are some who accept their losses as did the Swiss patriot who drew into his bosom the foreign spears, but there are others whose virtue will not stand the test.

JOBBERS.
LOUISVILLE, Feb. 1, 1882.

Eastern Claims against California Bankrupt.

The following letter, sent us for the information of those of our readers who have trade connections in California, will be found of interest:

SAN FRANCISCO, JANUARY 14, 1882.

Mr. C. K. Hawley, San Francisco, Cal.—
DEAR SIR: In reply to your inquiry: "Why do Eastern creditors have such difficulty in enforcing their claims in this State, and the remedy," I beg leave to reply:

1. By attachment. To attach property of a debtor in this State, the creditor's claim must be upon a contract made or payable in this State; hence Eastern merchants selling goods to our merchants upon orders sent East to them at their respective places of business, make the contracts where they do business, at New York, Boston, Philadelphia, &c., and cannot attach.

2. Our Insolvent Law provides: "An adjudication of insolvency may be made on the petition of five or more creditors residents of this State," whose debts accrued in this State, "provided that they, or either of them, have not become such creditors by assignment within thirty days prior to the filing of the petition." As a result of this condition of the law, any person or firm doing business here, and being heavily indebted to creditors residing out of this State, has but to settle up all its indebtedness to creditors residing in this State, except to any number less than five, and then he or they can cause himself or themselves to be attached by some of the remaining local creditors, and then neglect or refuse to go into voluntary insolvency, and their creditors outside of the State are perfectly helpless.

This has been demonstrated to the sorrow of Eastern creditors many times within the past two or three years. Of prominent cases I recall: Kennedy & Durr, dry goods, when they were attached by a local creditor. Enough (5) local creditors could not be found to put them into involuntary insolvency; they declined to go in voluntarily, and thus divide their assets ratably among their creditors; consequently their Eastern creditors were powerless, they lost some \$80,000, and the attachment took all their assets. Feist, Frank & Co., a case similar to the above. Loss to creditors residing out of this State, about \$300,000. M. H. Fay & Co., paid all local claims but two, were sued and attached

by those two. Will not go into insolvency. Cannot be thrown in, and the Eastern creditors lose all. Altschul, Seller & Co., a large crockery house, owing, as nearly as we can find out, to San Francisco creditors, about \$40,000, all of which has been attached, and to Eastern creditors upward of \$90,000, did on the day, and within a day or two before, they were attached (Dec. 31, 1881), pay off all their indebtedness in this State except to the said attaching creditors, and now they refuse to go into insolvency, and there are not five resident creditors to put them in; consequently, the attaching creditors will probably collect their claims in full, and the Eastern creditors will make a total loss.

Many more cases might be cited, but the above are sufficient; and you will have no difficulty in perceiving from the above statement what gross frauds may be, and are, committed. The remedy for this is simple. Most of the large Eastern houses have agents here, and if not, it would pay them well to have. Let such agent sell the goods here, and make the bills payable here, with exchange, and then he could attach when necessary, or take advantage of our insolvent laws when necessary; and failures would be less frequent and less disastrous to Eastern merchants when they happen.

Very respectfully,
JNO. H. DICKINSON.

THE IRON AND STEEL CENSUS.

Summary of the 1880 Statistics, by
James M. Swank, Special Agent.

(Continued).

GEOGRAPHICAL DISTRIBUTION OF SPECIAL PRODUCTS.

The various branches of our iron and steel industries have not been equally domesticated in each of the four grand geographical divisions that have been mentioned, and much less can it be said that they are equally at home in any one of the iron-making States or Territories. While this statement may embody only a self-evident truth, the full significance of the fact stated is deserving of some consideration. A glance at the statistics for 1880 shows that New England now makes but little pig iron, and that the South makes considerable pig iron and scarcely any rolled iron; that the West has embarked largely in the manufacture of steel by the Bessemer process, while New England cannot boast a single Bessemer establishment, but has preferred the open-hearth process; that New York makes most of the blooms that are made from ore, and Pennsylvania most of the blooms that are made from pig and scrap iron; that Michigan is the leading producer of charcoal pig iron, and now makes no other kind; that West Virginia has developed a remarkably active interest in the manufacture of cut nails; that only five States make Bessemer steel, and two States, Pennsylvania and New Jersey, make nearly all of our crucible steel; and that Pennsylvania has made a greater effort than any other State to manufacture all kinds of iron and steel. A glance, however, at leading geographical characteristics is not sufficient to illustrate the wide diversity of the influences which have affected the local development of our iron and steel industries, and the following details are therefore added.

PIG IRON.

Of 3,781,021 tons of pig iron and direct castings produced in 1880 in 22 States, Pennsylvania made 1,930,311 tons, or 51 per cent.; Ohio, 548,712 tons, or 15 per cent.; New York, 313,368 tons, or 8 per cent.; New Jersey, 157,414 tons, or 4 per cent.; Michigan, 119,586 tons, and Wisconsin, 118,282 tons—each over 3 per cent.; Illinois, 95,468 tons, and Missouri, 95,050 tons—each nearly 3 per cent.; West Virginia, 80,050 tons, or over 2 per cent.; Alabama, 62,336 tons, Maryland, 56,664 tons, and Kentucky, 58,108 tons—each over 1½ per cent.; Tennessee, 47,873 tons, or over 1 per cent.; and all other States and Territories, each less than 1 per cent.

Anthracite pig iron was produced in Pennsylvania, New York, New Jersey, Massachusetts, and Maryland—the last two States producing but little. Pig iron produced with a mixture of anthracite and coke was made in Pennsylvania, New York, Wisconsin, Illinois, New Jersey, and Maryland. Pig iron produced with bituminous coal and coke was made in Pennsylvania, Ohio, West Virginia, Missouri, Tennessee, Kentucky, Indiana, Illinois, Alabama, Georgia, Virginia, and Maryland. Charcoal pig iron was made in all of the States that made pig iron in 1880, with the exception of Illinois and New Jersey, which used mineral fuel exclusively.

ROLLED IRON.

Of 2,353,248 tons of rolled iron of all kinds produced in twenty-nine States and Territories in 1880, Pennsylvania made 1,071,098 tons, or 46 per cent.; Ohio, 272,094 tons, or 12 per cent.; New York, 163,538 tons, or 7 per cent.; Illinois, 117,051 tons, and Massachusetts, 109,252 tons—each 5 per cent.; Indiana, 77,880 tons, or over 3 per cent.; West Virginia, 67,437 tons; New Jersey, 66,030 tons; Kentucky, 65,293 tons; and Wisconsin, 60,653 tons—each a little less than 3 per cent.; Maryland, 47,609 tons, or 2 per cent.; Virginia, 35,176 tons; and Delaware, 33,918 tons—each about 1½ per cent.; Tennessee, 25,381 tons, or 1 per cent.; and all other States and Territories, each less than 1 per cent.

Of 466,917 tons of iron rails produced in 1880, Pennsylvania made 34 per cent.; Illinois, 16 per cent.; Ohio, 9 per cent.; Indiana, 8 per cent.; New York, 7 per cent.; Wisconsin, 6 per cent.; and Tennessee, each nearly 3 per cent.; Kansas and Tennessee, each nearly 3 per cent.; Wyoming Territory, Maryland and Georgia, each about 2 per cent.; California and Massachusetts, each 1 per cent.; and Colorado, West Virginia and Vermont, each less than 1 per cent.

Of the cut nails produced in 1880, Pennsylvania made 30 per cent.; West Virginia, 21 per cent.; Ohio, 14 per cent.; Massachusetts, 10 per cent.; New Jersey and Indiana, each 6 per cent.; Illinois and Kentucky, each 4 per cent.; and Tennessee and Virginia, each 2 per cent. New York, Nebraska and Maine each produced less than 1

per cent., but Nebraska made more nails than New York. The whole number of kegs of cut nails made in the United in 1880 was 5,056,600, each keg weighing 100 pounds.

STEEL INGOTS.

The following table shows the States which produced Bessemer, open-hearth, and crucible steel ingots in 1880 and quantity in tons:

States.	Bessemer steel ingots.	Open-hearth steel ingots.	Crucible steel ingots.
Connecticut.....	253,114	925	130
Illinois.....	275	275	73
Kentucky.....	8,409	5,475	149
Massachusetts.....	4,621	.....	.....
Missouri.....	450	10,462	.....
New Hampshire.....	.....	2,585	.....
New Jersey.....	82,811	24,713	300
Ohio.....	535,114	35,944	60,311
Pennsylvania.....	4,700	.....	.....
Tennessee.....	4,600	.....	.....
Vermont.....	.....	.....	.....
Total.....	985,203	84,302	76,201

Of the production of 985,203 tons of Bessemer steel ingots in 1880, Pennsylvania made 56 per cent.; Illinois, 26 per cent.; New York, 9 per cent.; Ohio, 8 per cent.; and Missouri, less than 1 per cent. Of the production of Bessemer steel rails, Pennsylvania made 55 per cent.; Illinois, 27 per cent.; Ohio, 9 per cent.; New York, 8 per cent.; and Missouri and Vermont, each less than 1 per cent. The last-named State had, however, no works for the production of Bessemer steel ingots. At the close of the census year there were 24 Bessemer converters in the United States, of which 6 were in Illinois, 2 were in Missouri, 2 were in New York, 2 were in Ohio, and 12 were in Pennsylvania.

OPEN-HEARTH STEEL.

Of the production of 84,302 tons of open-hearth steel ingots in 1880, Pennsylvania made 44 per cent.; Ohio, 29 per cent.; Massachusetts, 11 per cent.; New Hampshire and Tennessee, each 5 per cent.; Vermont, 4 per cent.; and Illinois, New Jersey and Kentucky, each less than 1 per cent. Of the open-hearth steel ingots produced in 1880, only a small quantity was converted into rails, the weight of these being 9105 tons. At the close of the census year 1880 there were 37 open-hearth furnaces in the United States, of which 2 were in Illinois, 1 was in Kentucky, 4 were in Massachusetts, 1 was in New Hampshire, 1 was in New Jersey, 10 were in Ohio, 14 were in Pennsylvania, 1 was in Rhode Island, 2 were in Tennessee and 1 was in Vermont.

CRUCIBLE STEEL.

Of the production of 76,201 tons of crucible steel ingots in 1880, Pennsylvania made 60,303 tons, or 79 per cent.; New Jersey, 10,492 tons, or 14 per cent.; New York, 2,585 tons, or over 3 per cent.; Connecticut, 2116 tons, or under 3 per cent.; and Ohio, Massachusetts, Illinois and Kentucky, an aggregate of less than 1 per cent. Pennsylvania, New Jersey and Connecticut also unitedly produced 4956 tons of blister steel and miscellaneous steel products, of which Pennsylvania produced 78 per cent.; New Jersey, 20 per cent.; and Connecticut, 2 per cent.

BLOOMS AND BAR IRON FROM ORE.

The total production of these products in 1880, nearly all of which, however, was in the form of blooms, was 37,633 tons, of which New York produced 84 per cent.; Missouri, 11 per cent.; Tennessee, 2 per cent.; New Jersey and North Carolina, each over one per cent.; and Pennsylvania, Georgia and Virginia, an aggregate of less than 1 per cent. Pennsylvania's product was made in a Siemens rotator; that of North Carolina, Georgia, Virginia and Tennessee by the old-fashioned Catalan process; that of Missouri by the Peckham process; while the more considerable product of New York was almost wholly made in American bloomeries—an improvement on the Catalan forge. The very small quantity of bar iron made from ore in 1880 was all made in Virginia, North Carolina, Georgia and Tennessee bloomeries. It aggregated but little over 1000 tons.

BLOOMS FROM PIG AND SCRAP IRON.

Of 34,924 tons of blooms of this character made in 1880, Pennsylvania produced 70 per cent.; Maryland and New Jersey, each 10 per cent.; Virginia, 7 per cent.; Georgia, over 1 per cent.; Tennessee about 1 per cent.; and New York and Massachusetts together, less than 1 per cent.

ALL KINDS OF RAILS.

The production of rails of all kinds in 1880 is given in the following table in connection with the States which produced them. The tonnage of rails produced in 1880 was greater than that of any other rolled product, and was about one-third that of pig iron.

States.	Iron rails—Tons.	Bessemer steel rails—Tons.	Open-hearth steel rails—Tons.	Total production of all kinds of rails—Tons.
California.....	6,000	.....	.....	6,000
Colorado.....	4,500	.....	.....	4,500
Georgia.....	8,673	.....	.....	8,673
Illinois.....	72,891	801,186	27,100	901,177
Indiana.....	38,600	.....	.....	38,600
Kansas.....	13,500	.....	.....	13,500
Kentucky.....	18,000	.....	.....	18,000
Massachusetts.....	9,280	.....	.....	9,280
Michigan.....	5,600	.....	.....	5,600
Missouri.....	.....	5,100	.....	5,100
New York.....	34,395	57,870	92,175	184,440
Ohio.....	44,838	60,460	108,118	213,416
Pennsylvania.....	157,213	499,329	7,970	654,512
Tennessee.....	12,950	.....	4,743	15,515
Vermont.....	4,500	1,500	3,000	6,000
West Virginia.....	3,331	.....	.....	3,331
Wisconsin.....	20,534	.....	.....	20,534
Wyoming Ter.....	9,421	.....	.....	9,421
Total.....	466,917	741,475	9,105	1,217,497

Pennsylvania made 47 per cent. of the total production of rails; Illinois, 23 per cent.; Ohio, 9 per cent.; New York, 8 per cent.; Indiana, 3 per cent.; Wisconsin, 2 per cent.; Kentucky, Tennessee and Kansas, each 1 per cent., and all other States and Wyoming Territory, each less than 1 per cent.

LABOR.

In the following table is presented a summary of the hands employed, hours of labor required and wages paid in the iron and steel industries of the United States in 1880, compared as far as possible with like statistics for 1870.

United States.	Males above 15 years.	Males below 15 years.	Females above 15 years.	Females below 15 years.
Grand total in 1880.....	113,202	7,709	45	82
Grand total in 1870.....	75,037	2,493	.....	.....
Per cent. of inc. 1880.....	77.52	216.46	.....	.....
Per cent. of dec. 1880.....	.....	43.12	.....	.....

United States.	Females below 15 years.	Total hands employed.	Average number of hours of labor per week.
Grand total in 1880.....	21	140,978	65
Grand total in 1870.....	.....	77,558	.....
Per cent. of inc. 1880.....	.....	81.78	.....
Per cent. of dec. 1880.....	.....	.....	.....

United States.	Average day's wages for a skilled workman.	Average day's wages for an ordinary laborer.	Total amount paid in wages.
Grand total in 1880.....	\$2.59	\$1.24	\$55,476,785
Grand total in 1870.....	.....	.....	\$48,544,081
Per cent. of inc. 1880.....	.....	.....	36.93
Per cent. of dec. 1880.....	.....	.....	.....

HANDS EMPLOYED AND WAGES PAID.

The total number of hands employed in 1880 was 140,978. Of the whole number, 133,203 were men above 15 years old, and 55 were women above 15 years old; 7709 were boys below 15 years old, and 21 were girls below 15 years old. The remarkably small number of 66 women and girls employed in the manufacture of iron and steel in 1880 will not escape notice, and is exceedingly creditable to our American civilization. The comparatively small number of boys employed is also worthy of notice.

The 140,978 persons who were employed in 1880 were paid \$55,476,785 as wages, or an average of \$393.51 for the year for each person. The average daily wages of skilled labor were \$2.59; of unskilled, \$1.24. The highest average daily wages of skilled labor were paid in Rhode Island, Colorado and Wyoming Territory—\$4; the lowest in North Carolina—\$1.25. The highest average daily wages of unskilled labor were paid in Wyoming Territory—\$2; the next highest in Colorado and California—\$1.75; the lowest in North Carolina—\$1.25. It may be remarked of North Carolina that its iron industry in 1880 was wholly confined to the use of the primitive ore bloomery, and that the labor employed was largely that of colored men. The average wages paid in the four grand divisions were as follows: Eastern States—skilled, \$2.70; unskilled, \$1.21. Southern States—skilled, \$2.09; unskilled, \$1.03. Western States—skilled, \$2.70; unskilled, \$1.31. Pacific States and Territories—skilled, \$3.50; unskilled, \$1.75.

It is necessary to explain that the figures of "hands employed" and "wages paid" refer to the labor directly employed at the various iron and steel works of the country, and in the mining and other operations conducted in direct connection with these works. They do not include the labor employed in independent and often remote mining operations which supply our iron and steel industries with ore and coal and other raw materials. (The statistics of these operations are being compiled by other hands.) Nor do they include any considerable part of the labor employed in the transportation of raw materials from the sources of production to the places of consumption. If the "hands employed" and "wages paid" in these various contributory channels were added to the figures given in our tables, the total number of persons directly supported by our iron and steel industries in 1880, and the total amount of wages paid to them, would be largely increased and probably doubled.

HOURS OF LABOR.

The average number of hours of labor required per week in the iron and steel works of the United States in 1880 was 65. This gives a little less than 11 hours for each day of the week. The average is high, in consequence of the general although not universal practice of operating blast furnaces, 7 days in the week, and in consequence also of the usual practice at blast furnaces, rolling mills and steel works of working 12-hour turns or shifts, which practice may require the presence of the workmen for that length of time, although they may not be, and generally are not, so long actually employed. The State which presents the highest average is Vermont—75 hours, while the lowest average in any of the States is found in Delaware and Kansas—56 hours. A still lower average is found in the District of Columbia—54 hours.

Mr. Robeson's bill in regard to a fast mail steamship line, now before Congress, authorizes the Postmaster-General to contract for and establish a weekly mail service between Fort Pond Bay, on Long Island, and Milford Haven, Wales, by means of a line of first-class steamships, and provides that the vessels shall be iron or steel screw steamships, capable of making at least 18 miles per hour, and shall be wholly of American construction. They shall be allowed to carry passengers and their baggage in addition to the mails, and do an ordinary express business, but shall not engage in any freight traffic. The Government shall have the right, in case of war, to take for the use of the United States any or all of the vessels employed on the line, on paying a reasonable compensation to the owners, not to exceed in any case the original cost of the vessels. The compensation for the mail service is graduated as follows: \$12,500 for each outward-bound trip made within 6 days; \$10,000 for each trip made within 7 days; \$7,500 for each trip made within 7½ days; \$5,000 for each trip occupying more than 7½ days. The project referred to will be recognized as the Corbin-Lordard line of six-day steamers.

The late William Ballard, whose funeral took place in Brooklyn on the 6th inst., was noted for his interest in many inventions, among which were the Goodyear rubber patent, the printing telegraph, the jack-screw for stowing cotton and tobacco on board of vessels, and others equally important.



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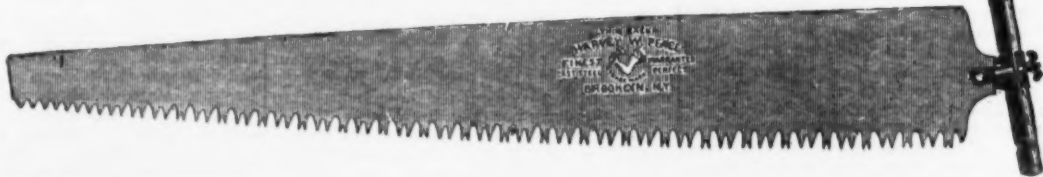
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Small Bit Boring from ½ in. to 1½ in.; Large Bit Boring from ¾ in. to 3 in. Warranted.

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Spearman Iron Co., Pa.
Elsa Iron Works, Ohio.
Milton Coal and Iron Co., Ohio.
Winona Furnace Co., Ohio.
Moss & Marshall, Ohio.
H. Campbell & Sons, Ohio.
Hocking Valley Iron Co., Ohio.
Cleveland Rolling Mill Co., Ohio.
Meier Iron Co., Ill.
North Chicago Steel Co., Ill.
Union Iron and Steel Co., Ill.
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Belt Hooks, Cutters, Spring Keys, D Rings,
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METALLURGICAL NOTES.

DEPOSITION OF METALS.

An improvement in depositing metals by the action of acid in an economical manner and without the aid of electricity, as usually applied in electro-bronzing, has been invented by Messrs. Maltby & Bradford, of Rotherham. The invention consists in immersing the article upon which the metal is to be deposited, for a period of time varying according to the thickness of the deposit required, in a vessel containing a solution of aquafortis (or other suitable acid) and water, in which is also placed and immersed a sufficient quantity (in plates or other suitable form) of the class of metal which is desired to be deposited.

COPPERING AND BRONZING ZINC.

The following recipes for coppering and bronzing zinc are said to produce very good results: Prepare a solution of 15 parts of blue vitriol and one of 10 parts of cyanide of potassium, then mix both solutions together. Incorporate this liquid well with 160 parts of pipe clay, and rub the resulting semi-fluid mass, by means of a linen rag, on the previously cleaned object. For bronzing, take 15 parts of verdigris, 10 of cream-of-tartar and 30 parts of crystallized soda, reduce them to powder, and dissolve them in the necessary amount of water. Mix this liquid together with 160 parts of pipe clay, and then proceed as above directed. Another process is as follows: Take 15 ounces of blue vitriol, 20 of calcined soda, and mix them well with 32 ounces of glycerine, and mix the paste obtained with 80 ounces of pipe clay. It is then ready to be applied as before stated.

PNEUMATIC CONVERSION IN THE SIEMENS-MARTIN FURNACE.

As an improvement to the Siemens-Martin process, Mr. T. A. Huggett, of Kensington, England, proposes to employ steam to blow the metal while it is in a liquid state in the furnace. He introduces the steam by means of a small iron pipe, connected with a steam boiler by a flexible connection. The end of this pipe he immerses for some inches beneath the surface of the metal, and in an inclined direction, so that the steam issuing from the pipe may mechanically promote circulation at the same time that, by its chemical action, it causes a rapid rise of temperature. The advantages which he obtains are a great saving in the amount of time required to bring the metal bath to the state of temperature suitable for running the metal out of the furnace into the ingot molds, a more complete separation of the sulphur and silicon than can otherwise be conveniently obtained, and the removal of the silicon when desired at an earlier stage than it otherwise would be, so leaving the steel with a high proportion of carbon, while the separation of the silicon has already been effectually obtained. In order to obtain sound ingots he causes the metal to enter the mold at the bottom, and he closes the top of the ingot mold with a loosely-fitting cast-iron stopper. Through the stopper there is a small hole. Instantly when the mold has become full of metal, and when the metal is close up, but not in contact with the under side of the plug, he admits a stream of water through the hole in the plug directly on to the top of the molten metal in the mold. He allows the water to run until the ingot is set.

NEW METHOD OF SEPARATING OXIDE OF IRON FROM ALUMINA AND TITANIC ACID.

The mixture of oxide of iron, alumina and titanic acid is calcined and weighed, and then dissolved in strong hydrochloric acid. Iron must be reduced to the state of protoxide, and this is best effected by means of a concentrated solution of hyposulphite of soda. A slight excess of this substance may be added without inconvenience. The solution thus obtained is neutralized partly by means of ammonia or carbonate of soda and then precipitated by means of a solution of cyanide of potassium, which must be added in slight excess. The whole is then boiled and iron is completely dissolved in the state of ferrocyanide of potassium. When the floating alumina, or mixture of alumina and titanic acid, is perfectly colorless, a small quantity of ammonia is added, as well as a few drops of sulphide of ammonium. The floating oxides should remain perfectly colorless and not assume even the faintest blackish or greenish tint, showing that the separation is absolutely perfect. The whole is then filtered and well washed, and alumina, titanic acid, and the almost over-present phosphoric acid, are separated and estimated by one of the known processes. One of the advantages of the process is the facility with which even minute quantities of titanic acid can be detected and estimated.

ROASTING PYRITES.

Chambers for condensing the fumes obtained by roasting arsenical and sulphurous pyrites are ordinarily constructed of brick, the roof, which is of considerable thickness, being formed either entirely of brick, or of brick covered with stone. The interior of these chambers is divided by transverse walls into compartments, which communicate with each other by means of openings in the said transverse walls, the openings being so arranged relatively to each other as to cause the fumes in passing through the chambers to take a zigzag course. Chambers so constructed are objectionable on account of imperfect action, rapid destruction, &c. In order to remedy these and many other defects, Messrs. H. N. Lay and Harry Bulford, of Calstock, England, propose to introduce flues in the transverse walls of the chamber, through which flues currents of air from the exterior of the chamber, which is covered with a roof of iron, are passed. By these means the heat absorbed from the fumes is rapidly removed and thrown off from the chamber. In order to protect the iron roof from the action of rain they erect over it a light covering or outer roof of wood, iron, or other suitable material, leaving sufficient space between the two roofs to admit of the free passage of air between them, and the free radiation of heat from the inner or main roof of the chamber. In order to prevent the rapid destruction of the brickwork of the chamber by the expansion and contraction caused by the heating and cooling thereof, the outer walls are braced together by means of bars or rods of iron, which pass through the air flues in the transverse walls, in order that the said bars or rods may be kept

cool and out of contact with the fumes in the chamber. By thus bracing the walls the inventors are enabled to build them of less than the ordinary thickness, and the radiation of the heat absorbed by them from the fumes is consequently much facilitated. Instead of forming the walls and the interior of the roof of the chamber entirely of brickwork, a portion of the chamber near the end at which the fumes enter consists partly or entirely of iron. By this construction of the chamber the heating of the arsenic or part thereof contained in the fumes is prevented, the heat of the fumes being very rapidly lowered on entering the chamber. Chambers constructed according to this invention are cheaper in first cost than those of the ordinary construction, besides being considerably more efficient and durable.

METHOD OF PURIFYING COPPER CONTAINING ARSENIC.

MM. J. J. Laveissière & Son, of Deville, near Rouen, France, in their method of refining copper containing arsenic, employ a crucible lined with a mixture of lime and tar. In order to avoid the rapid destruction of this lining, a so-called "false lining" is introduced, consisting of a mixture of some calcareous substance and peroxide of manganese. The ingots of copper to be refined are introduced, and while they are in a state of fusion the lining is heated, liberating carbonic acid gas and oxygen. These gases, in passing through the semi-fluid mass of copper, violently agitate and oxidize it, and when the copper is in a sufficiently liquid state the lime and peroxide of manganese also pass through the molten metal, carrying along the greater part of the arsenic acid formed. In order to remove the remaining traces, the copper is remelted, with the addition of basic fluxes, until it is entirely free from impurities. A specimen of copper containing .789 per cent. of arsenic and .32 per cent. of iron was found to contain:

	Arsenic.	Iron.
After the first fusion.....	.141	.022
After the second fusion.....	.113	traces
After the third fusion.....	.023	traces

This method of refining copper renders calcining unnecessary, and, as will be seen from the table above, gives entirely satisfactory results.

A NEW FURNACE SHIELD.

An invention known as the "Niagara" furnace shield, consists of a sheet of iron in front of the furnace, being hinged upon one side so as to admit of its being readily swung away from the mouth of the furnace while charging or removing a heat. About 6 inches of the upper edge of the shield is made receding, and along the top of this recess is secured a perforated tube, connected with a flexible or jointed feeding tube. By this means, jets of water from the pipe placed along at the top are spread over the whole surface of the shield and carried off at the bottom by a trough connected with a waste pipe which conducts the water to the box wherein the workman's tools are cooled. The object of the shield is to protect the workman from the great heat of the furnace. The water, which passes rapidly over the shield, experiences no appreciable change of temperature, consequently adding no expense for water supply. The shield is extremely simple in construction, inexpensive and not likely to get out of order easily.

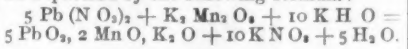
EXTRACTING COPPER FROM ITS ORES.

In extracting copper from its ores Mr. W. W. Hughes, of Bayswater, England, uses furnaces like ordinary reverberatory copper ore smelting furnaces, except that they have deep beds suitable to retain a bath of molten matter 10 inches or more in depth. These furnaces are of large size, and are provided with several tuyeres for blowing air among the contents of the bath. The tuyeres are inclined and are so set as to produce rapid circulation of the contents of the bath; they are also adjustable up and down, so that when at work they may be made to dip more or less into the bath, and may be drawn up to avoid clogging. The ore is first placed in the "desulphurating furnace," in which the crude ore is melted with suitable flux and the sulphur burnt off to some extent; it is then introduced into the accumulating furnace or roaster, in which the elimination of sulphur is carried further, and is finally allowed to enter the refining furnace, which may be like the refining furnaces already in use and without tuyeres. The "desulphurating furnace" is placed at a higher level than the accumulating furnace or roaster, and the latter at a higher level than the refining furnace, so that the metal may be run by suitable channels from furnace to furnace. There may be a convenient number of "desulphurating furnaces," and these may be at different levels, or otherwise, as preferred. A bath of molten material having been prepared in each of the furnaces, a high temperature is produced by the application of the blast, and the tuyeres are set to dip beneath the surface of the fused material. A charge of small ore is then dropped gradually into the bath and mixed in both by the rotation or circulation caused by the blast, and also by energetic ruffling or raking, so that the cold material may not fall to the bottom. A large furnace will take in this way a charge of 1½ to 2 tons. When a first charge thus put in is thoroughly melted and the bath is again at a full heat, another charge is added in a similar manner, and so on until the furnace is full. The slags are drawn off or removed from time to time as they form. The desulphurizing furnaces discharge their contents into the accumulating furnace or roaster, which is another furnace of same pattern as the desulphurizing furnaces, but which does not receive ore. Each desulphurizing furnace when full is about half emptied into the accumulator or roaster, and the former are thus prepared to receive free charges of ore. The metal is brought up to a higher standard in the accumulating furnace by the continued operation of the heat and blast, and is after some time run into the refining furnace, where the metal is finished in the usual way.

VOLUMETRIC ESTIMATION OF LEAD.

What is said to be an accurate and trustworthy method of estimating lead in ore is given in a recent issue of the *Oesterreichische Zeitschrift*. The ore is dissolved in nitric acid, boiled to dryness and dissolved in water. After the addition of caustic potash or oxide of zinc, the solution is treated with a standard solution of permanganate of

potassium, an excess of which imparts a reddish tint to the supernatant solution. The potassium-permanganate solution is added in small quantities, until the reddish tinge remains even after the application of heat. The result is not affected by alkalis, alumina, oxide of zinc, tin or antimony. Large amounts of copper and silver, as well as bismuth, cobalt, nickel or protoxide of iron, however, seriously injure the results. The chemical action which takes place after the addition of permanganate of potassium to the solution of lead and caustic potash may be expressed by the following formula:



INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

The Nashua Iron and Steel Company are making an addition to their plant, in the shape of a new 4-ton hammer. The company do a large business in heavy steel forgings. The White Mountain Freezer Co., of Nashua, are now in full operation in their new and commodious shops, with facilities for turning out 200 freezers per day. Their main shop has a floor capacity of 21,000 square feet, 200 feet of shafting in main line, 40-horse-power steam engine, 60-horse-power boiler for power and heating, &c.; boiler house, 100 x 30 feet, with rooms for tinning, galvanizing, blacksmith shop, &c.; also storehouse, 200 x 32 feet, 2 stories; also two dry houses for drying staves for freezer tubs, each of a capacity for drying 30 cords of staves at once. Their shipping facilities are first-class, having side tracks to each of their buildings, so that they can either take or deliver freight at any part of shops or storehouse. They occupy over two acres of land. This company were formerly at Laconia, and were burned out last year, with all their stock and tools, so their tools are new and most of them specially designed for the work.

MASSACHUSETTS.

The works of the Rodney Hunt Machine Co., at Orange, which were burned on the 24th of last month, will probably be rebuilt. The total loss is not as great as it was at first thought to be, being only about \$50,000, on which, however, there is but \$20,500 insurance. A part of an adjoining mill has been leased by the company, and the machinery will be set up and work carried on there until spring, when the works will be rebuilt. It is possible that a new site may be selected for the works.

The Brayton Petroleum Engine Co. have purchased buildings in East Bridgewater, which have been put in shape and machinery put in for manufacturing their engines. The works run at present by steam, but the company are building one of their engines, of 25 horse-power, which they will use to supply part of their power, and will probably build others to supply it all. The works can at present turn out about twelve engines a month.

The Deane Steam Pump Co., of Holyoke, are running overtime and employing 125 hands. The large pump supplied by this company for use on the Mississippi River improvements has been tested very severely by the engineers in charge of the improvements, being run at a speed of 18 strokes more a minute than the contract called for, and has been pronounced highly satisfactory.

We hear that the Merrimac Woolen Mills, at Lowell, finding the electric light more costly and less agreeable than gas, have removed their 16 electric lamps. These are probably are lights. On the other hand, it may be stated that the Merrimac Cotton Mills are introducing the new Edison incandescent light in their works.

The Taunton Crucible Company, Taunton, have largely increased their capacity during the past year, in order to be able to supply the increasing demand for their black-lead crucibles, orders being on hand which will keep the establishment busy until July. A new annealing kiln was added, and the number of power jiggers was doubled. The increasing business of the company is largely due to the success accompanying the use of their crucibles in melting German silver. We are informed that these crucibles are used to a great extent in the United States Assay Office in New York.

CONNECTICUT.

Miller Bros., steel-pen manufacturers, of Meriden, are employing 50 hands.

The large demand for the plain steel watch key manufactured by A. W. Clark, of the Plainville Watch Trimming Manufactory, has rendered an increase in the working force and hours necessary.

The cutlery works at Waterville are extending their works, being about to occupy part of another building.

PENNSYLVANIA.

According to the *Newcastle News*, the furnace of the Neshannock Iron Company, locally known as the Red Jacket Furnace, recently produced the largest quantity of pig iron ever produced by a furnace of the same size (60 x 16 ft.). The daily record for one week was as follows: 82, 83, 91, 97, 104, 103 and 114 gross tons. The total for the week was 679 tons. This product is very large for a furnace of that size, but at the same time it should be stated that one of Loughlin & Co.'s Eliza Furnace at Pittsburgh, which is 61 feet by 16 feet, made 130 gross tons of pig iron in one day in 1880, and in two consecutive days it made 253 tons. The Red Jacket Furnace and the Eliza Furnace are probably in advance of any other 16-foot furnace in the world.

We learn that the two stacks of the Shenango Furnace, at West Middlesex, are being torn down, preparatory to erecting a single large stack. These furnaces are each 46 x 10, and were built in 1859.

The E. & G. Brooke Iron Company cut at their nail factory, during the month of January, 10,112 kegs of nails. The shipments during the month amounted to about 20,000 kegs.

The Lucinda anthracite furnace, at Norristown, is for sale, the price asked being \$36,000. The furnace is in blast at present.

It is expected the Lyman-Haskell cannon for coast and harbor defense, now under construction at the Scott Foundry, will be finished by spring, when it will be taken to Staten Island, and tested there in the presence of leading Government officials. It will throw a shot weighing 150 pounds, with a total charge of 130 pounds of powder, or more than four times the weight of powder used with a shot of the same weight in the best guns now in use. As the ball passes the openings to the several pockets the heated gases fire the supplementary charges, increasing the velocity of the projectile to 4,000 feet per second when it leaves the muzzle of the gun—a velocity sufficient to carry the projectile 12 miles, or to enable it to penetrate 2 feet of wrought iron at a distance of 200 yards.—*Reading Eagle*.

The reining of Lemont Furnace is completed, and the stack is now undergoing the process of drying out. A new hot blast will be put up.

The operators of Stanton Colliery have announced that the fire in that colliery has been extinguished, and that the water would be all out by next week. It will probably take a couple of weeks to put the colliery in proper shape for work.

The Chester Springs Plumbago Company, with a capital of \$50,000, has been organized, and a charter granted by the State government. The company consists of several gentlemen of that section and elsewhere, among whom are J. L. Smith, William Pugh, O. L. Woodward and L. Moses. The proposition is to begin operations as soon as the weather is favorable. There are buildings suitable for the production of the mineral when put in order owned by the organization. In fact, the company own almost the entire village of Mosesville, with plenty of water and water power. It is claimed that an abundance of plumbago has been developed, so that from the start there will be cash returns.

We are informed that out of the three blast furnaces owned by the Chestnut Hill Iron Ore Company, Columbia, Lancaster County, furnace No. 1 is at present out of blast; No. 2 was blown in a few weeks ago, after having been entirely rebuilt, and is now doing well; No. 3 is in blast since September 26, 1881, giving entire satisfaction. The company have moreover in operation a large rolling mill, a machine shop and a foundry, the quantity of ore (brown hematite) mined per month amounting to about 5,000 tons.

The Phosphor-Bronze Smelting Co. (Limited), have recently started into successful operation, in Philadelphia, a rolling and wire mill for the purpose of more completely working phosphor-bronze alloys. They expect in this way to secure greater uniformity in products, besides enabling them to meet the wants of their customers promptly.

G. & H. Barnett, of the Black Diamond File Works, Philadelphia, are about making further and extensive additions to their establishment. Last July they commenced the erection of a two-story building 115 x 30 feet, which for a time relieved them somewhat, but their business has grown so rapidly that they are compelled to make further additions. They have recently purchased six houses on Richmond street and five on Eagle street, covering 220 x 110 feet, adjoining their works, upon which it is their intention to build a two-story addition, part of which is to be used in increasing their factory facilities, the balance for offices and warehouses. They will commence building early in the spring and expect to be in full working order by the 1st of July. They will then be able to employ about 300 hands, which, at present, would not more than meet the demand for their files. During 1881 they used about 400 tons of steel, and could have used more if they had had room. They have also closed contract for a 260 horse-power Corliss engine, which will be ready to start up the new works some time about midsummer.

PITTSBURGH AND VICINITY.

The Oliver Wire Company, manufacturers of plain and galvanized fence, telephone and telegraph wire, are operating their works to full capacity day and night, producing about 60 tons every 24 hours. When they took hold of the works last March the capacity was 15 tons per day. When improvements under way are completed, which will be about March 1, the capacity of the works will be something like 100 tons per day. The company make only steel wire.

It is reported that the old Glenwood Steel Works, purchased by Wm. McKinney & Sons, have been transferred to a company of which the McKinneys and Mr. Henry Lloyd, Jr., of H. Lloyd, Son & Co., are members, and that the plant will be put into operation soon.

Graff, Bennett & Co. are receiving consignments of structural iron from the Main Centennial Building, which they are using in the construction of their Millvale mill.

The Verona Tool Works of Metcalf, Paul & Co. have increased their business very greatly during the past year. Of their patent nut locks 41,214,153 were in use January 1, 1882, against 28,097,472 on January 1, 1881. These nut locks are used in very large quantities on many railroads of the United States, the Pennsylvania using nearly five millions of them; the Chicago and Northwestern, 3,692,690; and the Central Pacific, 2,342,000. Six other railroads are using over a million each.

WEST VIRGINIA.

The Standard Nail and Iron Co., of Clifton, have their fifteen additional nail machines in operation. With their mill on double time they cut during the month of January 12,196 kegs of nails. There is an active demand for their product.

Eighty nail machines are now in operation in the Laughlin mill, and everything doing well.

OHIO.

The Cuyahoga Works have just finished and started one of their largest size vertical blowing engines at the works of the Calumet Iron and Steel Company, South Chicago, Ill. The air cylinder is 84 inches bore and 54 inches stroke. The whole engine weighs over 80 tons; it will blow up to twelve pounds per square inch if required.

Brown, Bonnell & Co., Youngstown, will add to their works a link and chain department.

A powder company is among the latest of Youngstown's enterprises. A company has been formed and works are to be erected with a daily capacity of 200 kegs of sporting and blasting powder.

The Powell Tool Company, Cleveland, ax and tool manufacturers, employ 130 men. The Eagle Furnace blew in on the 10th on a new hearth and inwall, and is working nicely, making 16 tons No. 1 foundry iron.

W. D. Kelly & Sons, of Ironton, are making extensive improvements at the Grant Furnace. It is intended to put in a bell and hopper and work the furnace with closed top, thereby utilizing the gases which have so long been allowed to escape. By the addition of a short down-comer these gases will be conveyed to the hot-blast and used. They will also add several tuyeres and otherwise improve the furnace.

The Moxahala Furnace, at Moxahala, Perry County, is again in blast after a thorough repair and is making 40 tons of iron per day.

The burning of the Brilliant Glass Works, at Lagrange, Jefferson County, has thrown about 40 men out of employment. The works were built recently, and at the time of the fire were running full. The fire originated in the packing room from an exploded lamp. The loss is estimated at \$30,000, upon which there was \$24,000 insurance. The probabilities are that the works will not be rebuilt.

The *News-Register* furnishes the following figures as the daily production of pig iron in tons in the Mahoning Valley:

Furnace.	Owned by	Tons.
Hannah.....	Mahoning Valley Iron Co.....	70
Struthers.....	Struthers Iron Co.....	80
Andrews.....	Andrews Bros. & Co.....	100
Phoenix.....	Brown, Bonnell & Co.....	65
Falcon.....	Brown, Bonnell & Co.....	35
Eagle.....	Eagle Furnace Co.....	50
Himrod.....	Himrod Furnace Co.....	90
Grace.....	Briar Hill Iron and Coal Co.....	100
Briar Hill.....	Briar Hill Iron and Coal Co.....	75
Spiegel.....	Briar Hill Iron and Coal Co.....	25
Girard.....	Girard Iron Co.....	65
Niles.....	Girard Iron Co.....	35
Mary.....	Ohio Iron and Steel Co.....	40
Total daily production.....		845

The Chapin Bolt and Nut Co., Cleveland, are employing 100 men, and turning out 50,000 bolts and nuts daily.

The Lowry Hardware Co., Cincinnati, is the name of a new organization which was formed on the 23d of January last, the members being William H. Lowry, late secretary and treasurer of the Perin & Gaff Mfg. Co., Edward P. Nearn, late of the same company, and Henry Bode, Jr., late with William A. McCall & Co. They will conduct a wholesale jobbing business in heavy and light hardware and cutlery. Their offices and warehouses are at 114 West Second street.

At the annual meeting of the New York and Ohio Iron and Steel Company, the following gentlemen were elected directors: Gen. Samuel J. Thomas, of Columbus; Frederick J. Stone, Geo. F. Stone, Frederick A. Brown and Lenox Smith, all of New York. The board then elected Mr. Frederick J. Stone president, and Mr. Lenox Smith, vice-president; Mr. E. McMillan, general manager; vice G. H. Erammell, resigned and Heman L. Field, treasurer. The new directory are organizing for business, and it is thought that before long their mill will be running double turn, and their furnace in full blast.

The Hagerstown Agricultural Implement Manufacturing Company, of Hagerstown, Md., have removed their business to Newark, and have just completed their new brick shops, which cover nearly 7½ acres of ground, into which they have placed a new 150-horse-power Buckeye engine and boilers, and some new machinery. They have a capacity to work 500 men, and have just started up their machinery with 90 hands, and expect to work 200 more the present season in the building of their specialties, grain rakes, grain drills and the Victor double-buller clover machines, which are in such request that their old works at Hagerstown were not large enough to supply the demand the past few years. The present name of the company is the Newark Machine Company, with a capital of \$200,000.

ILLINOIS.

The Mexican trade of the Smith & O'Leary Steam Hammer Forge Works, of Chicago, is increasing. They have received another order for \$5000 worth of equalizing bars, brake chains and coupling links from a Mexican railroad.

The Springfield Iron Company have purchased a large coal mine in Macoupin County, paying \$60,000 for it.

The Gray Iron Company, of Chicago, have increased their capital stock from \$50,000 to \$100,000, and are making some important additions to their machinery.

The Molino Flow Company are now employing 400 men. They have recently added some valuable machinery to their works.

Eaton & Prince, of Chicago, are doing a large business in manufacturing elevators and general machinery, having been obliged for some time past to run fourteen hours per day. They are putting in some new machinery.

The Collins Flow Company, of Quincy, are making some additions and improvements, preparatory to manufacturing a new line of railroad plows, cultivators and scrapers.

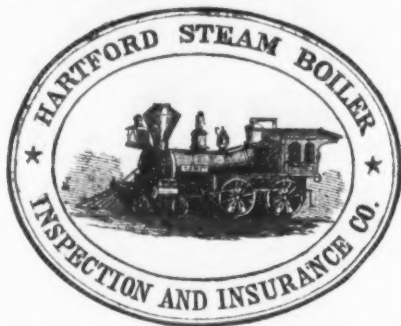
INDIANA.

The Perin & Gaff Manufacturing Company recently removed their offices, stock and fixtures from Cincinnati to their works at Jeffersonville, at which place their business will be done in the future.

The Atlas Engine Works, Indianapolis, have received the following orders: A complete steam outfit, consisting of a 14 x 20 Atlas engine, with a pair of 40 x 18 feet boilers, for the Brooklyn and San Miguel Mining and Reduction Company, to be used in connection with their mines at Columbia, Col.; a 100-horse-power Atlas Corliss engine for a paper mill at Hamilton, Ohio; seven new boilers, 45 inches diameter and 28 feet long, for the Indianapolis Steel Rail Mill; and a 14 x 42 Atlas Corliss engine, together with a pair of boilers, for a new mill in Georgia.

TENNESSEE.

During the past year the Roane Iron Company, Rockwood, expended large sums of money in improvements and repairs. A new Weimer engine has been placed in the works at a cost of about \$10,000. Furnace No. 1, the capacity of which was at the utmost thirty tons output per day, has been raised several feet, relined, and is now in full blast and turning out from fifty to fifty-five tons of iron per day. Furnace No. 2 is undergoing



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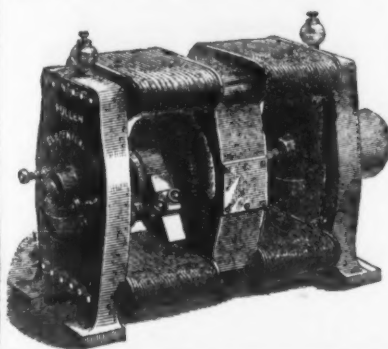
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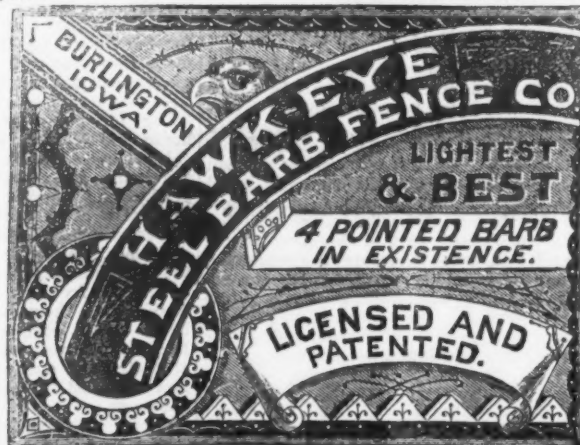
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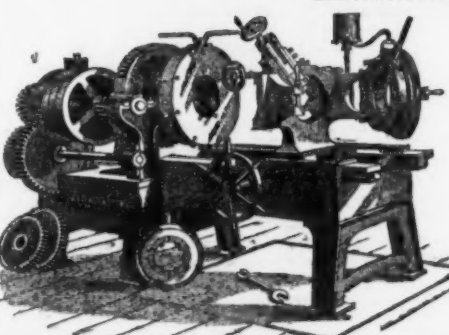
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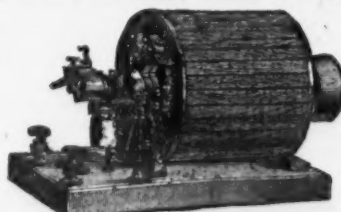
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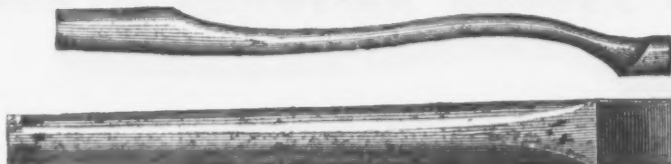
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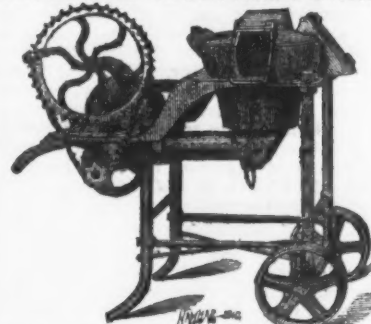
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110 South 5th St., and Sanson, bet. 8th
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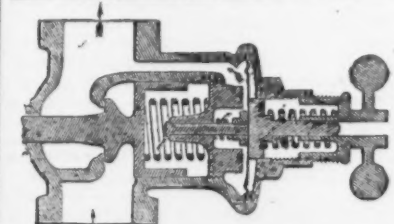
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4, 5 and 6 fingers.
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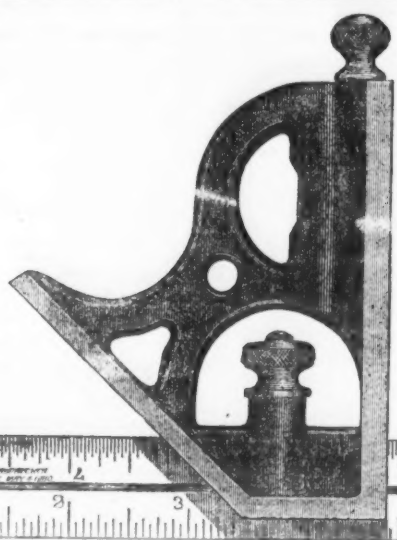
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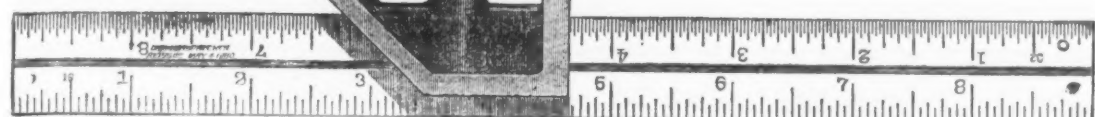
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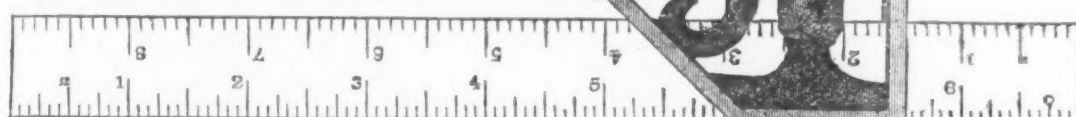
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Horizontal, Vertical and Locomotive Tubular
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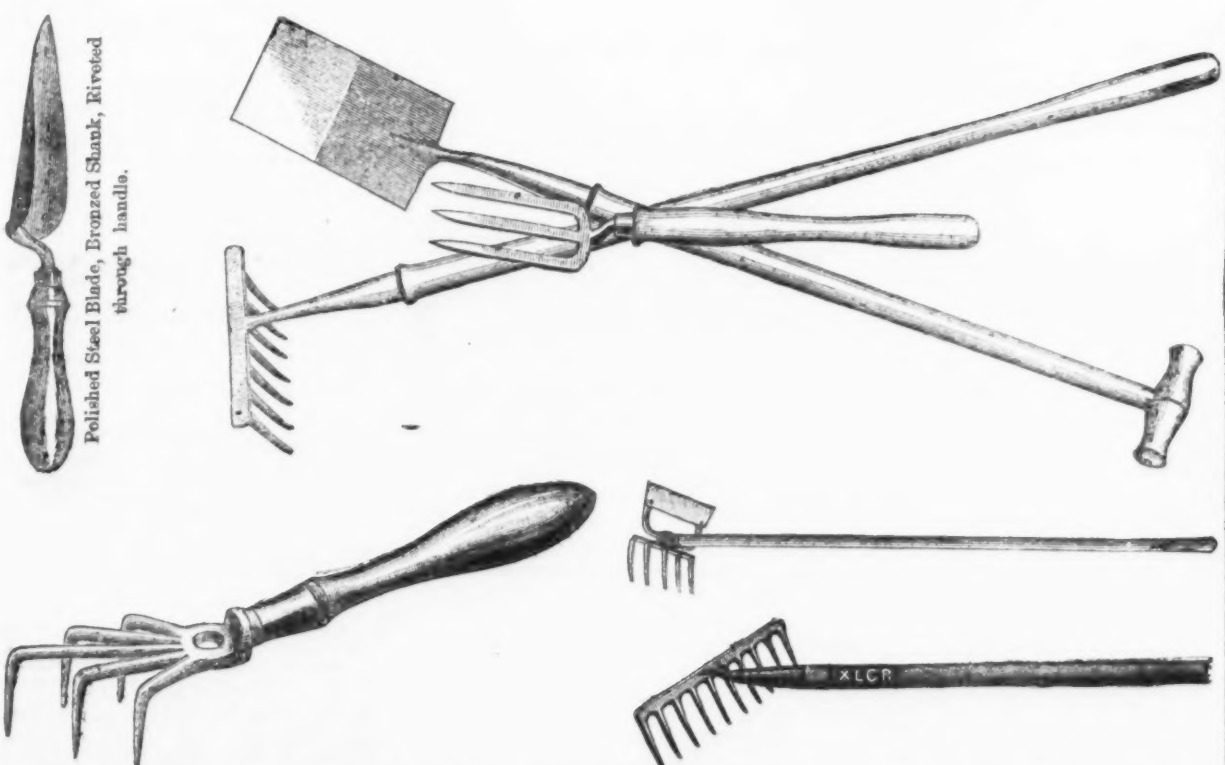
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ANALYSIS OF LOW MOOR IRON:

Graphite Carbon.....	3.402
Combined Carbon.....	.213
Silicon.....	2.692
Sulphur.....	None.
Phosphorus.....	.659
Calcium.....	.031
Manganese.....	Trace.
Iron, Nitrogen, Oxygen, Hydrogen and loss by difference.....	93.003
Amount of pure metallic iron found.....	100.000
	92.540

THE DETROIT STAMPING CO., DETROIT, MICH. BRASS, BRONZE, COPPER, And other Sheet Metal Goods to order. Electro-plating in all its branches.



15-INCH COLUMN DRILL,
11-15 Spindle, 11-inch Movement. Weights 450 lbs.
Price, \$135.
A. G. BROOKS & W. NEBRENER,
261 N. 3d Street, Philadelphia.
Also, on hand,
New Engine Lathes, 18, 22 and 24-inch swing. Second
hand hand Colman Drift, 24-inch swing.

repairs. It is being relined from bottom to top. Mr. Shetow, the superintendent, states that when No. 2 is completed, sixty-five tons per day can safely be counted on, with no bad luck, and if the facilities for filling the furnaces are sufficient. These will have no doubt to undergo a change, as the present arrangements are not of a greater capacity than to furnish material for seventy-five or eighty tons of metal per day, and with the two in blast the output will not be less, from the outlook, than 110 to 125 tons every twenty-four hours.

MISSOURI.
The Curtis Stove Works, of St. Louis, will start up again shortly. They have been idle for some weeks, undergoing repairs.
The new Rock Spring Works of the Missouri Stove Foundry Company will soon be ready to start up.
The Groom Shovel Company have been idle but two days in the past two years.

Our Production of Bessemer Steel in 1881.

The Bulletin of the Iron and Steel Association says:
We have received complete statistical reports from all the Bessemer steel works in the United States, giving their production of ingots and rails in 1881. The total quantity of Bessemer steel ingots produced in the United States in 1881 was 1,539,157 net tons, or 1,374,247 gross tons. The production in 1880 was 1,203,173 net tons; in 1879, 928,972 net tons; in 1878, 732,226 net tons. The increased production of 1881 over 1880 was 335,984 net tons, or 28 per cent.; over 1879 it was 610,185 net tons, or 66 per cent., and over 1878 it was 806,931 net tons, or 110 per cent. The production of Bessemer steel ingots in this country in the ten years from 1872 to 1881 has been as follows, in net tons:

Years.	Net tons.	Years.	Net tons.
1872.....	120,108	1877.....	560,587
1873.....	170,652	1878.....	732,226
1874.....	191,933	1879.....	928,972
1875.....	375,517	1880.....	1,203,173
1876.....	525,496	1881.....	1,539,157

Bessemer steel ingots were produced in 1881 by 13 works, of which 7 are in Pennsylvania. Two new works, both in Pennsylvania, produced Bessemer steel in 1881 for the first time. These works are those of the Pittsburgh Bessemer Steel Company, Limited, located at Homestead, near Pittsburgh, having two converters, and the Pittsburgh Steel Casting Company, of Pittsburgh, having but one converter. The Pittsburgh Bessemer Steel Company, Limited, made its first blow on March 19, 1881, and the Pittsburgh Steel Casting Company made its first blow on August 26, 1881. Some extensions were made to the old works in 1881, and two new works are in course of erection now. A comprehensive exhibit of the Bessemer steel works of the country completed and in progress is as follows:

Names of Companies.	Converters.	
	Completed.	Building.
Albany and Bessemer Iron and Steel Co., Troy.....	two 6½-ton	.....
Bethlehem Iron Co., Bethlehem.....	four 7-ton	.....
Pennsylvania Steel Co., Steelton.....	two 6½-ton	.....
Lackawanna Iron and Steel Co., Scranton.....	three 8-ton	.....
Cambria Iron Co., Johnstown.....	two 7½-ton	.....
Carnegie Bros. & Co., Limited, Bessemer.....	two 6-ton	.....
Pittsburgh Bessemer Steel Co., Limited, Homestead.....	three 10-ton	.....
Pittsburgh Steel Casting Co., Pittsburgh.....	two 4-ton	.....
Cleveland Rolling Mill Co., Cleveland.....	one 7-ton	.....
North Chicago Rolling Mill Co., Chicago.....	two 6½-ton	.....
Union Iron and Steel Co., Chicago.....	two 6½-ton	.....
Joliet Steel Co., Joliet.....	two 5½-ton	.....
Vulcan Steel Co., St. Louis.....	two 5½-ton	.....
Scranton Steel Co., Scranton.....	two 6½-ton	.....
Colorado Coal and Iron Co., South Pueblo.....	two 4-ton	.....
Total.....	31	6

Only 30 converters were in use in 1881, as Carnegie Bros. & Co., Limited, have substituted a three-converter plant since the close of the year for their two-converter plant. The new works at Scranton, Pa., and South Pueblo, Col., and the extension of the North Chicago Rolling Mill Company's works will probably be in operation some time during the first half of 1882.

The American producers of Bessemer steel rolled 1,253,129 net tons, or 1,118,865 gross tons, of Bessemer steel rails in 1881. But this is not the whole quantity of Bessemer steel rails rolled in the United States in that year, as quite a large quantity, estimated in the neighborhood of 100,000 gross tons, was rolled by iron rail mills from imported blooms. The total production of Bessemer steel rails in 1881 was therefore about 1,200,000 gross tons, as we some time ago estimated it would be, but the exact figures cannot be given until we receive full statistical reports from the iron rail mills of the country. The following table shows the growth of our production of Bessemer steel rails in the ten years since 1872, the qualifying statement in regard to 1881 being borne in mind:

Years.	Net tons.	Years.	Net tons.
1872.....	94,070	1877.....	430,159
1873.....	120,015	1878.....	570,398
1874.....	144,044	1879.....	683,954
1875.....	290,823	1880.....	924,460
1876.....	412,451	1881.....	1,253,129

A New Bell Foundry.—The Philadelphia Smelting Co., Limited, have on exhibition at their place, corner of Twelfth and Noble streets, a peal of four bells made from de-oxidized bronze. This is a new industry in Philadelphia, but one that seems likely to become of considerable importance. De-oxidized bronze is said to be superior to any other alloy of copper and tin, the same degree of hardness giving greater density and tenacity, so that the timbre of the bells is uniform throughout. The company have prepared schedules for peals of nine bells from 2800 to 23,000 pounds the set, and they guarantee them superior to anything in the United States, and equal to the best from Belgium. Their system of manufacture they claim to be the result of scientific investigation, so that there is no uncertainty in producing any desired results, either in weight, quality, character of the scales, or uniformity of timbre. For each peal or chime, mathematical drawings are made for each separate bell. The utmost care is then used in preparing the sweeps, in the molding and drying of molds and core, as well as in the mixture and pouring of the metal. The schedules include peals in the keys of C, A and F in single scales, and in F and C, D and A, F and B flat in double. The latter can be extended on each side, lighter and heavier to include any number of scales required by the addition of other bells beyond the octaves, a peal of ten bells giving three different keys—eleven giving four, &c. The peal of four bells can be inspected any day during business hours at Twelfth and Noble streets.

WASHINGTON NOTES.

WASHINGTON, D. C., Feb. 7, 1882.

The House Committee on Ways and Means to-day reported a bill providing for the appointment of a commission to investigate the question of the tariff. The vote was taken after a warm discussion, and in the result reached indicates a radical departure from the principles of the Morrill Tariff Commission, to which the sub-committee had devoted earnest attention. The vote on its adoption stood as follows: Yeas—Messrs. Kasson, McKinley, Hubbell, Haskell, Errett, Randall, Spear and Kelley (chairman)—8. Nays—Messrs. Dummell, Russell, Tucker, Carlisle and Morrison—5. The opposition of the last three gentlemen named to the Morrill bill, as stated some weeks ago, was because it included the consideration by the commission of the internal revenue laws, as well as the tariff. The following is the text of the bill:

A BILL to provide for the appointment of a commission to investigate the question of the tariff:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a commission is hereby created, to be called the "Tariff Commission," to consist of nine members.

Sec. 2. That the President of the United States shall, by and with the advice and consent of the Senate, appoint nine commissioners from civil life, one of whom—the first named—shall be the president of the commission. The commissioners shall receive, as compensation for their services, each at the rate of \$10 per day when engaged in active duty, and actual traveling and other necessary expenses. The commission shall have power to employ a stenographer and a messenger, and the foregoing compensation and expenses to be audited and paid by the Secretary of the Treasury out of any moneys in the Treasury not otherwise appropriated.

Sec. 3. That it shall be the duty of said commission to take into consideration and to thoroughly investigate all the various questions relating to the agricultural, commercial, mercantile, manufacturing, mining and industrial interests of the United States, so far as the same may be necessary to the establishment of a judicious tariff, or a revision of the existing tariff laws upon a scale of justice to all interests, and for the purpose of fully examining the matters which may come before it. Said commission, in the prosecution of its inquiries, is empowered to visit such different portions and sections of the country as it may deem advisable.

Sec. 4. That the commission shall make to Congress a final report of the results of their investigation, and the testimony taken in the course of the same, not later than the first Monday of December, 1882, and they shall cause the testimony taken to be printed from time to time and distributed to Members of Congress by the Public Printer, and shall also cause to be printed, for the use of Congress, 2000 copies of their final report, together with the testimony.

A member of the Ways and Means Committee remarks that it is now certain that the whole tariff question will be brought up for debate in the House. The McKinley Hoop Iron Bill will come up for action before the committee next Friday.

Senator Allison's bill to fix the amount of the resumption fund and to authorize the issue of gold certificates, is expected to give rise to an extended debate in the Senate. The proposition is to issue to an unlimited amount against the deposit of gold coin, this coin to be held in the Treasury until the owners of it shall require it again. The benefits to accrue to the Treasury from such an arrangement are not obvious.

At a meeting of the East River Bridge Trustees, on Monday afternoon, the explanation of Engineer Roebling in regard to the increase of the weight of the bridge and the delay, &c., was read and laid on the table until the next regular meeting. The Committee on Transit recommended the circulating system of transit over the bridge, the cars being propelled by an endless wire rope. The total cost would be about \$500,000. The statement of the financial condition of affairs to the 31st of January, 1882, shows that there have been received from New York, \$4,537,900; from Brooklyn, \$8,657,037; and from other sources, \$344,010. The cash expenditures to that date were \$13,439,590.56. The cash on hand amounts to \$99,350.49, and the liabilities, \$101,353.45.

Fall of a Monster Piston.—At the meeting of the Jersey City Board of Works on Wednesday, Mr. Sites, the Chief Engineer of the Department, reported that the monster piston of the cylinder in Cornish Engine No. 3, at the Belleville Water Works, fell a few days ago. It weighed 17 tons, and crushing through the cylinder, broke the foundation of the engine so as to make its repair an enterprise of doubtful propriety. The report thus made is the first intimation the public has been allowed to have of the accident. Mr. Sites is not prepared to state the pecuniary extent of the accident, but says that if the engine is to be repaired it will take several months to put it in condition again. He suggests that it may be deemed advisable to replace the engine with one of another pattern. The accident has not caused any perceptible abatement of the water flow.

The death is announced of Major Sir William Palliser, C. B., the inventor of the "Palliser projectiles" and improvements in the construction of heavy guns. He was born in Dublin, June 18, 1830.

Special Notices.

WE DESIRE TO LOCATE

Agricultural Works,

Just starting, in some well situated Western town willing to give liberal cash bonus to a concern that will be alive and growing. Address

MANUFACTURING CO.,

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Bolt and Nut Machinery, &c., for Sale.

One Header, Lewis Oliver & Phillips, second-hand.

Two-Header Burdick Forged Headers, second-hand.

Two-Header Lowell Forged Headers, second-hand.

One Cold Upsetter or Header, Chapin make, second-hand. Will head 6 in. long by 3/4 open dies.

Two Key-Seat Cutters, most improved style, second-hand.

One Double-Punch and Shears, Allatator No. 7, second-hand.

One Thorn & De Haven Drill, second-hand.

One Double-Bolt Cutter, Smith maker, little used.

Also our full line of National Machinery Co.'s manufactures: Hot-pressed and Hot-forged Nut

Machines; Bolt Cutters, National Head, 3 sizes;

Rivet, Track Bolt, Pointers, Burrs, and full out-

fits for Bolt and Nut manufacturers. Address

NATIONAL MACHINERY CO., Cleveland, Ohio, the only Specialists in the United States.

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Being the extensive property formerly occupied by the

BUFFALO IRON AND NAIL WORKS AT BLACK ROCK, IN THIS CITY.

The buildings cover over three acres, and are of brick and wood, substantially constructed, and with slate roofs. They could easily be changed, if necessary, to suit almost any kind of business.

Water and railroad communication to all parts of the country.

Maps of the property, with full description, sent on application.

F. P. PRATT or F. L. PRATT, Buffalo, N. Y.

Cold Press Nut Punch.

Nearly new, graded to 1, with adjustable side gear, so to 1, three speed, large and small nuts; weight, 240,000 pounds.

SHIMER & CO.,

250 South 3d St., Philadelphia.

A Philadelphia Tin Plate & Metal House

desires the services of a thoroughly competent traveling Salesman. None other need apply.

Address POST OFFICE BOX 1693,

stating age, references and territory best acquainted with.

For Sale.

One Beam Engine, 25 x 48, in first-class condition in every respect, patent cut off, Shive governor, exhaust pipe heater, 18-foot fly wheel, &c., all complete. Price \$1200; easy terms.

SHIMER & CO.,

250 South 3d St., Philadelphia.

FOR SALE.—MINE CARS.

Fifty Mine Cars for 3 ft. 6 in. track; are end dumps of most approved pattern, strongly built, and fitted with the Thomas self-oiling chilled wheel, capacity about 3 1/2 tons. Will be sold cheap. Address

JAMES E. THOMAS,

Newark, Ohio.

For Sale.

On reasonable terms, a first-class Iron and Brass Foundry, with full equipment for making light and heavy castings of all kinds; powerful cranes, cupolas, ovens, &c., with a heavy stock of patterns. Located in Philadelphia, Pa. Apply to

W. E. ERNST,

727 Walnut St., Philadelphia, Pa.

For Sale.

Edge Tool and Ax Manufactory, established thirty years, doing a business yearly from three to five times capital required. Located in a thriving Western city, with valuable local trade. Address for particulars

EDGE TOOLS,

Office of *The Iron Age*, 83 Reade St., New York.

To Let.

Office Room to let on ground floor,

110 Chambers Street.

WALTER C. HARLOW.

FORGINGS.

A practical man, having some capital to invest, would like to hear from parties who are desirous of establishing the Forging Business in their neighborhood. State location, chances for business and inducements that can be offered to

W. H. N. & CO.,

Office of *The Iron Age*, 83 Reade St., New York.

Wanted.

A live man to assist the proprietor in a general line of Wholesale and Retail Hardware and Agricultural Implement business. Must be a good bookkeeper and financier, and have some experience in the business. First-class references required. Parties expecting a big salary need not answer this. Address

ASSISTANT,

Office of *The Iron Age*, 83 Reade St., New York.

WANTED AT ONCE.—An experienced Mechanical Draftsman, who is accustomed to Blast Furnace, Rolling Mill Work and general machinery. Address, stating salary required and references

PERCY B. BEVERLEY,

Supt. Lynchburg Iron Co., Lynchburg, Va.

WANTED.—By a young man with four years' experience in ship and heavy hardware, a position as stockkeeper, salesman or bookkeeper, or would sell goods on the road. East preferred. Address

H. J. F.,

Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

For Sale.

THE LUCINDA FURNACE,

Norristown, Pa.

Anthracite Blast Furnace, with modern improvements; three Hot Blast Stoves, Vertical

Holst, ample Engine and Boiler Power; size, 13 x 40 feet; capacity, 150 tons per week. Will be sold in blast and in perfect working order. Stock

can be received by the Philadelphia and Reading Railroad, or Schuylkill Canal, and the new branch of the Pennsylvania Railroad, as surveyed, passes

within one square of furnace. Price \$36,000.

Apply to

E. M. VALENTINE,

265 South 4th Street,

Philadelphia.

ASH HANDLES

for Forks, Shovels and Spades in large quantities

and of good quality, for home trade or export.

ALLEN & NIXON,

53 Maiden Lane, New York.

German Silver Workers.

Wanted, a Foreman to take charge of shops making German silver forks and spoons. Must be temperate, reliable and thoroughly competent to take charge of whole work. Situation permanent and desirable. Address, with full particulars of experience and salary desired,

GERMAN SILVER,

Office of *The Iron Age*, 83 Reade St., New York.

BLACKSMITHS' FORGES

(PATTERSON'S PATENT).

Portable or stationary, superior to stone or brick. Can be used with bellows or fan. Send for information to the

FORGE COMPANY,

Brooklyn, E. D. N. Y.

Proposals for Construction

Iron Market Hall.

By order of the Government of the Province of

Pas, in the Empire of Brazil, it is made public that in this Consulate General proposals will be received till March 2, 1892, for the construction of an Iron Market Hall in the Capital of said Province.

Any Parties desiring information in regard to such proposals can apply to the same Consulate, No. 42 Broadway, where printed specifications will be furnished and the plans of the projected building can be inspected.

New York, Jan. 30, 1892.

SALVADOR DE MENDONCA,

Brazilian Consul General in the United States.

To Manufacturers.

An enterprising business man, going every year to Europe, wishes to sell American Hardware suitable for that market on commission. Can give first-class references. Address

F. L. COMMISSION,

Office of *The Iron Age*, 83 Reade St., New York.

THE NEW ENGLAND

Manufacturers & Mechanics' Institute

will hold their Second Annual Exhibition at Boston, in their specially constructed Exhibition Building, the largest in the United States, during

SEPTEMBER AND OCTOBER, 1892.

Exhibitors invited from the whole world. Blank forms of applications for space sent upon application to

JOHN F. WOOD, Treasurer,

38 Hawley Street, Boston, Mass.

A Rare Chance for a Manufacturer.

To lease for a term of years, at Milton-on-the-Hudson, a good Water-Power, with Buildings, which have been used as a Foundry and Machine Shop very successfully. Five minutes from the steamboat landing. Address

JOHN F. BALL,

Milton, Ulster Co., N. Y., or

HENRY DICKINSON,

243 Broadway, New York.

Wanted.—Rolling Mill Machinery.

1 SET 10 IN., 3-HIGH ROLLS.

1 SET 12 IN., 3-HIGH ROLLS.

Furnaces, Boilers, Engine, second-hand, good order.

SHELDON & CO., Auburn, N. Y.

Wanted.

TRAVELING SALESMEN (who have the liberty to carry other goods) to represent a line of Specialties for the Hardware, Upholstery and Picture-frame trade, on which a good commission can be made. The goods are manufactured by an old and responsible company. All communications will be strictly confidential. Address

SPECIALTIES,

Office of *The Iron Age*, 83 Reade St., New York.

WANTED.—Party having been engaged in other business for a year wishes a position in first-class concern making House Furnishing or Builders' Hardware, to travel South preferred; am well acquainted through Southern States, and with manufacturing here; when last in this business was buyer for large city jobbing house, to whom I can refer. Address

HARDWARE,

care Gullman & Co., New York City.

WANTED.—A Roller for nine-inch mill and two Heaters. None but strictly temperate men need apply. References as to ability and habits required. Liberal pay guaranteed. Address

SYRACUSE IRON WORKS,

Syracuse, N. Y.

WANTED.—A young man wants a situation as Clerk in a first-class Hardware house. Ten years' experience in the general hardware business. Best of references. Address P. O. BOX 91, Lykens, Pa.

Situation Wanted.

By a practical Galvanizer, competent to take charge of works. Can furnish the very best of references. Address

GALVANIZER,

Office of *The Iron Age*, 83 Reade St., New York.

WANTED.—A situation as Foreman by a man who has had twenty-five years' experience in the iron foundry business, and who has a thorough knowledge of light castings. Can furnish good reference. Address FOUNDRY, Post Office New Room, Bridgeport, Conn.

AN EXPERIENCED Civil, Mining and Mechanical Engineer is open to engagement as engineer and manager of large works. Address

ENGINEER AND MANAGER,

Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,

Issue Licenses to use the Process for the Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens Martin, Puddling, Blast and Cupola Furnaces.

The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of *The Iron Age* of Oct. 25th, 1891.

To Railroads, Mill Owners and Contractors.

STRUCTURAL IRON WORK FOR SALE.

Having purchased the Ironwork of the Main Centennial Building, situated in Fairmount Park, Philadelphia, we now offer the same in sections to suit purchasers. These buildings can be sold in widths varying from 100 to 150 feet, and of any height from 40 feet down to 25 feet, and in length from 100 to 700 feet. We have eight Spiral Stairways, in all over 800 steps.

Plans showing how all parts of these buildings may be utilized in railroad depots, &c., have been prepared by Messrs. Wilson Bros. & Co., of Philadelphia, civil engineers and architects, and can be seen at the office of Mackintosh, Hemphill & Co., Limited, Fort Pitt Foundry, Pittsburgh, Pa., or at the office of the company, at Centennial Building, West Philadelphia.

Wishing to dispose of the above quickly, we are prepared to offer great inducements to purchasers, both as to low price of material and promptness of delivery. Any communications addressed to the CENTENNIAL STRUCTURAL CO., care of Mackintosh, Hemphill & Co., Limited, will receive prompt attention.

Partnership Dissolution.

NOTICE is hereby given that by the death of the junior partner, Nathan Anthony, the firm of BRADFORD & ANTHONY is this day dissolved.

The affairs of the firm will be settled by the undersigned, the sole surviving partner.

MARTIN L. BRADFORD.

Boston, June 12, 1891.

All communications in regard to the affairs of the late firm should be addressed to

BRADFORD & ANTHONY, Boston, Mass.

MARTIN L. BRADFORD hereby gives notice that he will continue his business under the name of "BRADFORD & ANTHONY."

The estate of the late Nathan Anthony is to be in no way interested in the future business, whether conducted under the name of Bradford & Anthony or otherwise.

All business communications should be addressed to BRADFORD & ANTHONY,

174 Washington St., Boston.

Importers, Manufacturers' Agents and Dealers in Cutlery, Fishing Tackle, Skates.

See advertisement first issue each month.

IRON RAILS. STEEL RAILS.

THE SPRINGFIELD IRON COMPANY

are open for orders for IRON AND STEEL

RAILS for prompt delivery.

Apply to the Company at Springfield, Illinois, or to

JAMES JOHNSTON, Agent,

30 Pine Street, New York.

Wholesale Hardware.

Parties wishing to invest in Wholesale Hardware business in a Western city, please address

A. E. K. & Co.,

Office of *The Iron Age*, 83 Reade St., New York.

Special inducements offered.

Wanted.

A first-class Furnaceman to act as founder at a coke furnace, 16 feet in bush, with all modern improvements. No one except a thorough practical man need apply. Must have best of references. Good salary would be paid to the right man.

FOUNDER,

Care S. B. Lowe, Chattanooga, Tenn.

Wanted.

An old boiler shell, suitable to construct into a foundry cupola; diameter not less than 45 inches or over 47 inches; length not less than 30 feet or over 32 feet. Name call for it.

HEENER & SONS,

Landale, Penn.

Wanted Immediately.

A competent man to run an air furnace to make heavy castings and rolls. One who thoroughly understands the business can get good wages. Address

POPE IRON AND METAL CO.,

St. Louis, Mo.

Wanted.

A soft-coal burning, Consolidated or Tank Locomotive of about 25 tons, six-wheeled, coupled with pony truck; tank capacity, 1 ton of coal and 1000 galls. water; dia. of cylinder, 13 x 18 in. and thereby driving wheels 36 in. dia., closely coupled with trailing wheels behind furnace. Weight distributed as follows: Truck, 2 1/2 tons; tank, 2 1/2 tons; driving wheels, 30 tons. Straight boiler preferred. Address

WALDEN'S RIDGE RAILROAD CO.,

Jenks P. O., Roane Co., Tenn.

A YOUNG MAN with fourteen years' experience in office work as assistant bookkeeper, salesman and confidential clerk, desires a position of trust and responsibility. Willing to travel. Satisfactory references. Address W. Box 43,

Office of *The Iron Age*, 83 Reade St., N. Y.

WANTED.—Situation as Roll Turner. Experienced on all kinds of shaped and bar iron. Best References. Address

ROLL TURNER,

Office of *The Iron Age*, 220 S. 4th St., Phila., Pa.

A THOROUGHLY EXPERIENCED SALESMAN, fully acquainted with Pig and Manufactured Iron trade, also practical mechanical knowledge of Pumps, Engines and Machinery, with extensive acquaintance with best trade in Middle and Western States, is open for engagement with first-class Commission or Manufacturing House, on good salary or paying commissions. Address, with name and particulars,

"EXPERIENCE," Box 60,

Office of *The Iron Age*, 83 Reade St., New York.

WANTED.—Employment in the Hardware trade (wholesale preferred), in a Western or Southern State. Have had nine years' experience in retailing Hardware and Stoves. Am young, and not afraid of work. Can give the best of references. Address

L. O. WALKER, Indianapolis, Iowa.

PUNCHING PRESS AND SHEAR FOR SALE.—A

Roller-maker's Punching Machine, 24-inch throat, punch-line 3/4 hole in 1/4 in. Also a Power Shear; will shear 3/4 plate-iron 34 inches in width. Weight, 4000 pounds. PERFECT PUNCH AND SHEAR CO., 115

Liberty Street, New York.

Special Notices.

Second-Hand and New Machinery.

The following Tools ready for delivery at an early date:

Two Lathes, 15 in. x 6 ft. New.

Three 22-in. Upright Back-Gear Drills. New.

Four 22-in. Upright Back-Gear Drills. New.

One 20-in. Upright Back-Gear Drill. New.

One 16-in. Upright Back-Gear Drill. New.

One 11 in. x 5 ft. Lathe. New.

One 11 in. x 5 ft. Foot Lathe. New.

IN STORE.

Three Lathes, 22 in. x 8 ft. New.

Four Lathes, 18 in. x 8 ft. New.

One Lathe, 17 in. x 8 ft. Lincoln.

Two Lathes, 16 in. x 6 ft. Wood & Light.

One Lathe, 16 in. x 6 ft. Wood & Light.

One Planer, 70 in. x 11 ft.

ceased on the main line of the Pennsylvania Railroad, and is as convenient for the shipment of goods as our former location. Awaiting your future orders, we remain,
Yours respectfully,
CHALFANT MFG. CO., Anglen, Pa.

IRON.

A movement is on foot looking to the establishment of an Iron Exchange in this city, and a preliminary meeting will be held on Wednesday, the 15th inst., at Delmonico's, No. 2 South William street, at 3 o'clock, p. m., to which the Iron trade in all its branches are invited. We have received the following announcements:

New York, January 31, 1882.

See: It being desirable to obtain an expression of opinion from all that are interested, on the question of organizing an "Iron Exchange," the undersigned request your presence at a meeting to be held for that purpose on Wednesday, February 15, 1882, at 3 o'clock p. m. at Delmonico's, No. 2 South William street:

B. G. CLARKE.
E. F. HATFIELD, JR.
E. S. WHEELER & CO.
CHAMBERLAIN & CO.
GEO. A. EVANS.
POST, MARTIN & CO.
MAYER BROTHERS & CO.
PERKINS & CHATEAU.
U. O. CRANE & BRO.
T. D. HAZARD.
B. B. LEMAN & CO.
THOS. J. POPE & BRO.
JAS. LEE & CO.
JOHN H. THOMPSON & CO.
JAMES JOHNSTON.
WM. LAWRENCE STROUD.
S. D. SCHUYLER.
NAYLOR & CO.
J. B. & J. M. CORNELL.
DELAFIELD & CHAPMAN.

American Pig.—Although the tone of the market is not as active as it was during the month of January, and the inquiry has tapered off considerably, the deliveries on contracts continue to absorb the production, and we do not hear of the slightest pressure to sell. Prices rule remarkably firm as follows: Foundry No. 1 X, \$26.50 @ \$27; Foundry No. 2 X, \$25; Grey Forge, \$24.

Scotch Pig.—The demand for Scotch Iron is fairly active, and for some brands the shipments to this port are engaged for 30 days ahead. Sales announced during the week include 400 tons Glemarnock, 100 tons Garmbroe and about 600 tons various brands, in lots, at our quotations. The difficulty in obtaining freight room for Pig Iron from Glasgow to this port is greatly increased by the heavy demands on the steamship companies by shippers of potatoes, the high prices paid for this class of freight—ranging, it is said, from 25/ to 30/ per ton—making it first choice. We quote Eglington, \$24.50 @ \$25; Carnbroe, \$25.50 @ \$26; Coltness, \$27.75 @ \$28.50; Glemarnock, \$25.50 @ \$26.50; and Gartahorrie, \$26 @ \$27.

Bessemer Pig.—We hear of a sale of 3000 tons Bessemer Pig for shipment, but the terms are withheld.

Rails.—Considerable business in Steel Rails has transpired during the week, and sales are reported of 13,000 tons by the Lackawanna Iron and Coal Company, for full delivery, at \$57.50 at mill, and 6000 other makes in lots, on private terms. In Iron Rails no new business is reported. We continue to quote Steel at mill, \$57 @ \$60, according to time of delivery, and Iron, \$48 @ \$50.

Old Rails.—The only business reported since our last is a sale of 1500 tons T's, ex store, at \$30.25. The tone of the market is dull. We quote: T's, \$30.50 @ \$31, and D. H., \$32.

Scrap.—We quote: No. 1 Wrought, to arrive, \$31.50 @ \$31, and Yard lots, \$33 @ \$33.50. Business quiet.

Manufactured Iron.—The demand continues fairly active, and difficulty is experienced in keeping up assortments. The price of Refined Bars from store was to-day advanced from 2.9¢ to 3¢. The demand for Structural Iron continues to be very heavy and a good many orders are being placed abroad.

A. B. Whitney & Co., No. 58 Hudson street, inform us that they are importing this class of Iron and can supply Channels, Beams, Angles and T's at about 1/4¢ @ 1/2¢ below the price of the domestic article. They claim to be able to execute orders in about 30 days after receipt of specifications.

METALS.

Copper.—Sales since our last report have not exceeded 100,000 pounds Lake Superior at 10 1/2¢, but these seem to have been effected merely for the purpose of affecting the market, because it suits certain important parties for the moment to exercise some pressure. The chief producers decline parting with any under 20¢, which is also the asking figure for Baltimore. In Europe the metal markets, Copper included, are looking up again, as was to be foreseen. The panic on the Paris stock exchange, it seems, merely knocked down some shares inflated beyond measure, affecting only temporarily solid securities, and as all the powerful financiers and banks did not want the panic to become a real one, extending to everything alike, all co-operated to keep the flurry within bounds. The result has been a general rebound. At any rate it is good for the spring trade in merchandise, both in Europe and here, that this cloud which was overhanging the skies has been unclouded so early in the year, and that we need not trouble ourselves about it any further. Things may now take their natural course and merchandise has got a fair chance before it wherever intrinsic value has been

reached. Best Selected has thus recovered to 27¢ at London, while Chili Bars have stood at 26¢. To The Iron Age direct per cable from London to-day: "Copper.—The demand continues to fall off and transactions are small." We quote: Best Selected, nominally 27 1/2¢. This shows a slight receding of 1/2¢ in Best Selected since yesterday.

The consumption in England and France has been 111,012 100,324 103,861 Tons. Tons. Tons.

The supplies were thus distributed:

Chili 1881. 1880. 1879. Tons. Tons. Tons.
Spain 40,580 45,499 40,804
Australia 32,170 32,616 27,900
Sundries 8,091 9,509 9,417
Total 80,841 87,624 78,121

The Bureau of Statistics prints the following figures on the imports and exports of Copper for the eleven months of the year 1881, in pounds:

November. 11 mos. 11 mos.
Imports, foreign 76,599 76,770 45,136,646
Re-exports 4,457 196,214 754,635

Net imports 72,142 76,576 44,382,011

Exports, domestic 149,758 6,954,953 3,750,011

Net exports 77,616 6,954,953 3,750,011

Imports, foreign 76,599 76,770 45,136,646

Re-exports 4,457 196,214 754,635

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Net exports 77,616 6,954,953 3,750,011

Imports, foreign 76,599 76,770 45,136,646

Re-exports 4,457 196,214 754,635

Net imports 72,142 76,576 44,382,011

Spelter and Zinc.—Spelter has all along been moderately active at \$5.90 @ \$6 for Common Domestic. Silesia cannot be had under 5 1/2¢, for while all other metals were last week temporarily depressed by the financial disturbance, Spelter did not decline a sixpence per ton. Nay, there are now chances that between increased European consumption and the notable revival in the Spelter demand on this side, the metal may tend upward in Europe in the near future. While during all 1881 the United States only imported 2150 tons of Spelter, in January last some 1500 tons were thus received, without lowering the price lastingly. How much there is still on the way remains doubtful, but from all appearances another 1500 tons this month would not influence the price much, for the West absorbs more and more for galvanizing purposes, and the people there have got none for the moment to spare us. Thus sales were made at St. Louis at 6¢, which would be equal to 56¢ here. We receive per cable to-day: "Spelter.—There is but little demand, and quotations are nominally 17. 10/ ordinary at shipping ports." The following returns for eleven months by the Bureau of Statistics are of interest:

November. 11 mos. 11 mos.
Imports, foreign 1,410,444 2,541,777 5,980,037
Exports 33,848 1,254,700 1,630,468

Excess of imports 1,376,596 1,287,077 4,349,569

The movement in Sheet Zinc was as follows:

November. 11 mos. 11 mos.
Imports, foreign 286,867 2,131,249 3,973,112
Exports 15,584 74,578

Net imports 271,283 2,056,671 3,898,534

Sheet Zinc is quiet at 7 1/2¢ @ 7 3/4¢.

Antimony.—Some Cookson has been sold as low as 14 1/2¢ during the week, but what there remains of it cannot be had below 15¢. The demand is fair, but buyers come forward reluctantly, being in hopes that the price may recede; there is, however, not much prospect for a decline. American is steady at 15¢.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy 11 1/2¢
Copper, light 11 1/4¢
Yellow Metal 10 1/2¢
Brass, heavy 10 1/2¢
Brass, light 10 1/4¢
Composition, heavy 10 1/4¢
Lead, heavy 9 1/2¢
Zinc 9 1/4¢
Pewter, No. 1 9 1/4¢
Pewter, No. 2 9 1/4¢
Wrought Iron 9 1/4¢
Light do 9 1/4¢
Stove Plate 9 1/4¢
Machinery do 9 1/4¢
V. M. do 9 1/4¢
Electrotype plates 9 1/4¢
Stereotype plates 9 1/4¢
Small type 9 1/4¢

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

White, No. 1 3 1/2¢
White, No. 2 3 1/4¢
White, No. 3 3 1/4¢
White, No. 4 3 1/4¢
White, No. 5 3 1/4¢
White, No. 6 3 1/4¢
White, No. 7 3 1/4¢
White, No. 8 3 1/4¢
White, No. 9 3 1/4¢
White, No. 10 3 1/4¢
White, No. 11 3 1/4¢
White, No. 12 3 1/4¢
White, No. 13 3 1/4¢
White, No. 14 3 1/4¢
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White, No. 27 3 1/4¢
White, No. 28 3 1/4¢
White, No. 29 3 1/4¢
White, No. 30 3 1/4¢
White, No. 31 3 1/4¢
White, No. 32 3 1/4¢
White, No. 33 3 1/4¢
White, No. 34 3 1/4¢
White, No. 35 3 1/4¢
White, No. 36 3 1/4¢
White, No. 37 3 1/4¢
White, No. 38 3 1/4¢
White, No. 39 3 1/4¢
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White, No. 51 3 1/4¢
White, No. 52 3 1/4¢
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White, No. 65 3 1/4¢
White, No. 66 3 1/4¢
White, No. 67 3 1/4¢
White, No. 68 3 1/4¢
White, No. 69 3 1/4¢
White, No. 70 3 1/4¢
White, No. 71 3 1/4¢
White, No. 72 3 1/4¢
White, No. 73 3 1/4¢
White, No. 74 3 1/4¢
White, No. 75 3 1/4¢
White, No. 76 3 1/4¢
White, No. 77 3 1/4¢
White, No. 78 3 1/4¢
White, No. 79 3 1/4¢
White, No. 80 3 1/4¢
White, No. 81 3 1/4¢
White, No. 82 3 1/4¢
White, No. 83 3 1/4¢
White, No. 84 3 1/4¢
White, No. 85 3 1/4¢
White, No. 86 3 1/4¢
White, No. 87 3 1/4¢
White, No. 88 3 1/4¢
White, No. 89 3 1/4¢
White, No. 90 3 1/4¢
White, No. 91 3 1/4¢
White, No. 92 3 1/4¢
White, No. 93 3 1/4¢
White, No. 94 3 1/4¢
White, No. 95 3 1/4¢
White, No. 96 3 1/4¢
White, No. 97 3 1/4¢
White, No. 98 3 1/4¢
White, No. 99 3 1/4¢
White, No. 100 3 1/4¢

FOREIGN TRADE MOVEMENTS.

The following is a summary of foreign trade movements for the past week:

For the week ending February 4:

Total. 1882. 1881. 1880.
Prev. reported 35,822,211 31,034,579 37,160,139

Since Jan. 1. \$44,991,683 \$5,593,766 \$14,009,581

Included in the imports were articles of merchandise valued as follows:

Quantity. Value.
Anvils 231 \$1,087
Brass goods 23 4,080
Copper goods 23 4,080
Lead goods 23 4,080
Zinc goods 23 4,080
Iron goods 23 4,080
Steel goods 23 4,080
Tin goods 23 4,080
Copper wire 23 4,080
Iron wire 23 4,080
Steel wire 23 4,080
Tin wire 23 4,080
Copper plates 23 4,080
Iron plates 23 4,080
Steel plates 23 4,080
Tin plates 23 4,080
Copper rods 23 4,080
Iron rods 23 4,080
Steel rods 23 4,080
Tin rods 23 4,080
Copper tubes 23 4,080
Iron tubes 23 4,080
Steel tubes 23 4,080
Tin tubes 23 4,080
Copper sheets 23 4,080
Iron sheets 23 4,080
Steel sheets 23 4,080
Tin sheets 23 4,080
Copper bolts 23 4,080
Iron bolts 23 4,080
Steel bolts 23 4,080
Tin bolts 23 4,080
Copper nuts 23 4,080
Iron nuts 23 4,080
Steel nuts 23 4,080
Tin nuts 23 4,080
Copper washers 23 4,080
Iron washers 23 4,080
Steel washers 23 4,080
Tin washers 23 4,080
Copper rivets 23 4,080
Iron rivets 23 4,080
Steel rivets 23 4,080
Tin rivets 23 4,080
Copper screws 23 4,080
Iron screws 23 4,080
Steel screws 23 4,080
Tin screws 23 4,080
Copper nails 23 4,080
Iron nails 23 4,080
Steel nails 23 4,080
Tin nails 23 4,080
Copper wire rope 23 4,080
Iron wire rope 23 4,080
Steel wire rope 23 4,080
Tin wire rope 23 4,080
Copper cable 23 4,080
Iron cable 23 4,080
Steel cable 23 4,080
Tin cable 23 4,080
Copper rope 23 4,080
Iron rope 23 4,080
Steel rope 23 4,080
Tin rope 23 4,080
Copper chain 23 4,080
Iron chain 23 4,080
Steel chain 23 4,080
Tin chain 23 4,080
Copper link 23 4,080
Iron link 23 4,080
Steel link 23 4,080
Tin link 23 4,080
Copper band 23 4,080
Iron band 23 4,080
Steel band 23 4,080
Tin band 23 4,080
Copper strap 23 4,080
Iron strap 23 4,080
Steel strap 23 4,080
Tin strap 23 4,080
Copper bandage 23 4,080
Iron bandage 23 4,080
Steel bandage 23 4,080
Tin bandage 23 4,080
Copper tape 23 4,080
Iron tape 23 4,080
Steel tape 23 4,080
Tin tape 23 4,080
Copper cord 23 4,080
Iron cord 23 4,080
Steel cord 23 4,080
Tin cord 23 4,080
Copper line 23 4,080
Iron line 23 4,080
Steel line 23 4,080
Tin line 23 4,080
Copper thread 23 4,080
Iron thread 23 4,080
Steel thread 23 4,080
Tin thread 23 4,080
Copper yarn 23 4,080
Iron yarn 23 4,080
Steel yarn 23 4,080
Tin yarn 23 4,080
Copper fabric 23 4,080
Iron fabric 23 4,080
Steel fabric 23 4,080
Tin fabric 23 4,080
Copper cloth 23 4,080
Iron cloth 23 4,080
Steel cloth 23 4,080
Tin cloth 23 4,080
Copper paper 23 4,080
Iron paper 23 4,080
Steel paper 23 4,080
Tin paper 23 4,080
Copper ink 23 4,080
Iron ink 23 4,080
Steel ink 23 4,080
Tin ink 23 4,080
Copper paint 23 4,080
Iron paint 23 4,080
Steel paint 23 4,080
Tin paint 23 4,080
Copper oil 23 4,080
Iron oil 23 4,080
Steel oil 23 4,080
Tin oil 23 4,080
Copper grease 23 4,080
Iron grease 23 4,080
Steel grease 23 4,080
Tin grease 23 4,080
Copper wax 23 4,080
Iron wax 23 4,080
Steel wax 23 4,080
Tin wax 23 4,080
Copper resin 23 4,080
Iron resin 23 4,080
Steel resin 23 4,080
Tin resin 23 4,080
Copper varnish 23 4,080
Iron varnish 23 4,080
Steel varnish 23 4,080
Tin varnish 23 4,080
Copper glue 23 4,080
Iron glue 23 4,080
Steel glue 23 4,080
Tin glue 23 4,080
Copper cement 23 4,080
Iron cement 23 4,080
Steel cement 23 4,080
Tin cement 23 4,080
Copper mortar 23 4,080
Iron mortar 23 4,080
Steel mortar 23 4,080
Tin mortar 23 4,080
Copper plaster 23 4,080
Iron plaster 23 4,080
Steel plaster 23 4,080
Tin plaster 23 4,080
Copper concrete 23 4,080
Iron concrete 23 4,080
Steel concrete 23 4,080
Tin concrete 23 4,080
Copper brick 23 4,080
Iron brick 23 4,080
Steel brick 23 4,080
Tin brick 23 4,080
Copper tile 23 4,080
Iron tile 23 4,080
Steel tile 23 4,080
Tin tile 23 4,080
Copper stone 23 4,080
Iron stone 23 4,080
Steel stone 23 4,080
Tin stone 23 4,080
Copper wood 23 4,080
Iron wood 23 4,080
Steel wood 23 4,080
Tin wood 23 4,080
Copper coal 23 4,080
Iron coal 23 4,080
Steel coal 23 4,080
Tin coal 23 4,080
Copper gas 23 4,080
Iron gas 23 4,080
Steel gas 23 4,080
Tin gas 23 4,080
Copper electricity 23 4,080
Iron electricity 23 4,080
Steel electricity 23 4,080
Tin electricity 23 4,080
Copper steam 23 4,080
Iron steam 23 4,080
Steel steam 23 4,080
Tin steam 23 4,080
Copper heat 23 4,080
Iron heat 23 4,080
Steel heat 23 4,080
Tin heat 23 4,080
Copper cold 23 4,080
Iron cold 23 4,080
Steel cold 23 4,080
Tin cold 23 4,080
Copper light 23 4,080
Iron light 23 4,080
Steel light 23 4,080
Tin light 23 4,080
Copper sound 23 4,080
Iron sound 23 4,080
Steel sound 23 4,080
Tin sound 23 4,080
Copper smell 23 4,080
Iron smell 23 4,080
Steel smell 23 4,080
Tin smell 23 4,080
Copper taste 23 4,080
Iron taste 23 4,080
Steel taste 23 4,080
Tin

318,327 tons, against 314,752 tons in the corresponding week last year, an increase of 3575 tons. The total amount of anthracite mined for the year is 1,653,283 tons, against 1,526,481 tons for the same period last year. The total amount of bituminous mined for the year is 306,310 tons, against 236,023 tons for the corresponding period last year.

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth st., Philadelphia, Feb. 7, 1882.

Pig Iron.—The movement during the week has been very light, but prices are steady and unchanged. In some departments of trade prices are inclined to weakness, although Pig is but slightly affected, and it would be a matter of extreme difficulty to obtain concessions on any of the standard makes. Some who were aspiring to fancy figures have modified their ideas a little, but as a rule there is a steady market, with very little prospect of lower prices and, as we have intimated, not so much desire to push for an advance as there was some time ago. There is nothing positive in the outlook, however, except that consumption is likely to be large and prices in all probability without much change in either direction. The chances are so evenly balanced that there are, in fact, very few willing to speculate on either side of the market. It is not surprising, therefore, that with so large a business parties are anxious to catch the first indication of a change, so that they may trim their sails accordingly. Advocates on both sides have a fair case as matters stand, but the evidence is not sufficient to warrant decided action. The trade in its various aspects has been discussed in these columns, from week to week, and there has been nothing of importance developed requiring additional comment, so far as we can see. Ores are a little dearer, and the tendency is toward higher cost all around. Stocks are light, and with prospects of a more active demand as spring approaches, furnace men appear to have good and sufficient grounds for holding firmly to quoted rates. The disposition to advance, however, is held in check by the weakness in foreign markets and the heavy stocks held in Great Britain. It is quite likely that the course of affairs will be decided eventually by two influences, viz: the condition of European markets and our crop prospects. If both these should develop favorably, higher prices may be regarded as certain, while contrary developments would be equally certain to bring lower prices. All departments are actively, and it is believed profitably, employed, so that the future is not endangered by speculative contracts, and whatever changes there may be in the immediate future are likely to be the result of circumstances outside of the American Iron trade. Sales during the week have been made at about the following prices, f. o. b. cars at furnace: No. 1 Foundry, \$24.50 @ \$26; No. 2, \$23 @ \$23.50—business largely at the inside rates; Gray Forge, \$22.50 @ \$23; Mottled, \$21 @ \$21.50, and White, at \$20 @ \$20.50.

Foreign Iron.—Bessemer is irregular, and hard to quote with anything like accuracy. Holders are asking \$27, but sales have been made at \$26, and from that to \$26.50, according to date of shipment, is probably a fair quotation at which business can be done. Prices are gradually settling down, and in spite of the high rates of freights, buyers find the tendency of the market in their favor. There is not much disposition to buy, however, and it would probably not require much demand to start prices on the up track again, so that quotations need to be revised almost daily. Middlesboro Iron is quite neglected. Lots in store are available at about \$21.50, but there is scarcely any demand for it at present.

Muck Bars.—The market is slightly easier, and sales have been made at \$46.50 @ \$47, with sellers at \$46.50 @ \$47.50. The demand is moderately active, but prices are considered high.

Blooms.—There is no change to report, and sales are made at about the following rates, viz: Charcoal Blooms, \$75; Run-out Anthracite, \$62.50 @ \$65; Scrap Blooms, \$55, and Northern Ore Blooms, \$50.

Bar Iron.—The demand is still heavy, but prices are not quite as strong as they were some time ago. There is no difficulty in getting 2.8¢ @ 2.85¢ for Refined Iron, but the upward tendency has been checked, and there is besides a good deal of inferior iron offering, which has its effect on the market. All the mills are running full with a fair amount of orders to complete, but new business is not offering in such quantities as was noticeable a few weeks ago. There is no reason to anticipate any scarcity of business, however, the falling off in demand not being because of diminished consumption, but rather because there is less fear of higher prices. There are a good many large orders waiting for favorable opportunities of placing them, but as yet there is little prospect of anything being done at less than 2.8¢ for Refined Iron. The store price has been advanced to 3¢, and a fair business is reported from all classes of consumers.

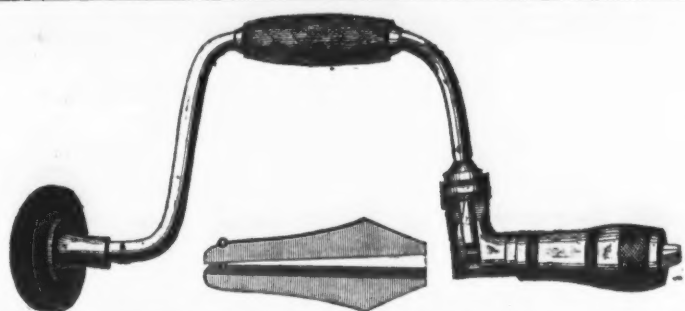
Plate and Tank Iron.—The market is dull, and manufacturers are ready to take orders at quoted prices, and would probably grant concessions if the specification was a specially desirable one. The mills have work enough on hand to carry them pretty well into next month, besides which there is a very fair demand for small lots for current delivery, so that prospects are fair, although not as bright as they were some time ago. Prices are unchanged, viz: Tank Iron, 3.5¢; Refined at 3.75¢; Shell at 4¢; Flange at 5.25¢ @ 5.50¢, and Firebox at 6.25¢ @ 6.50¢.

Structural Iron.—Business is quite active, some large orders having been ordered within the past two or three weeks. Prospects in this branch of business are particularly bright, and prices are very firm—say, Angles, 3.25¢; Beams, 4¢; Channels, 4.2¢; Tees, 4.3¢, and Bridge Plates about 3.5¢.

Sheet Iron.—There is no change to report, a fair business being done at steady and unchanged prices, viz: Common Sheet, No. 27 and 28, 5.5¢; Common Sheet, No. 26, 5.5¢; Common Sheet, No. 25, 5.5¢; Common Sheet, No. 24, 5.5¢; Common Sheet, No. 23, 5.5¢; Common Sheet, No. 22, 5.5¢; Common Sheet, No. 21, 5.5¢; Common Sheet, No. 20, 5.5¢; Common Sheet, No. 19, 5.5¢; Common Sheet, No. 18, 5.5¢; Common Sheet, No. 17, 5.5¢; Common Sheet, No. 16, 5.5¢; Common Sheet, No. 15, 5.5¢; Common Sheet, No. 14, 5.5¢; Common Sheet, No. 13, 5.5¢; Common Sheet, No. 12, 5.5¢; Common Sheet, No. 11, 5.5¢; Common Sheet, No. 10, 5.5¢; Common Sheet, No. 9, 5.5¢; Common Sheet, No. 8, 5.5¢; Common Sheet, No. 7, 5.5¢; Common Sheet, No. 6, 5.5¢; Common Sheet, No. 5, 5.5¢; Common Sheet, No. 4, 5.5¢; Common Sheet, No. 3, 5.5¢; Common Sheet, No. 2, 5.5¢; Common Sheet, No. 1, 5.5¢; Common Sheet, No. 0, 5.5¢; Common Sheet, No. -1, 5.5¢; Common Sheet, No. -2, 5.5¢; Common Sheet, No. -3, 5.5¢; Common Sheet, No. -4, 5.5¢; Common Sheet, No. -5, 5.5¢; 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off rapidly, and the future promises well. In the Ardennes great firmness is noticeable on the basis of 18.50 to 19 for No. 3 Merchant. There is a great and increasing demand in that district for machine-made Nails in excess of the capacity of production. This may also be said of Bolts, which rose 1½ to 2 francs per 100 kg. The feeling remains a strong one in the Haute-Marne, in the Loire and Rhone basin Merchant Iron commands 2 francs at St. Etienne; railway material is in active request. In the Nord and Nord-Est no more orders are accepted for the fore half of the year. An extraordinary liveliness remains at the North on the basis of 18.50 to 19 for Merchant material. The weather has not been cold enough to impart much life to household Coal; industrial is active.

tunnel. When this has been com-
ed the pressure of air will be removed
n this tunnel. On the north tunnel,
ch extends about 100 feet beyond the
th tunnel, a number of men are building
rick bulkhead, and as soon as this is com-
ed the air pressure will be removed and
rk will then be carried on in the south
nel until the heading is level with the
ding of the other tunnel, when a brick
head will be built in the latter, in which
air-locks will be placed.



BIT BRACES FOR 1882.

After having made almost every kind of a Bit Brace and tried them on the market, we find that our BARBER IMPROVED BRACE, as seen in this Cut, is the only one which gives universal satisfaction. During the past six months we have made some slight changes on this Brace, which remove all objections to it and make it absolutely perfect. We are aware that other Braces are sold at a less price, but they are also made at a less cost. Everything which goes into the Barber Brace is of the best and most expensive quality, and one of them will outlast six of any other kind. The Sweeps and Jaws are of steel, the Head of lignumvitæ and Revolving Handle of rosewood. It is highly polished and heavily nickel plated. The Jaws will hold, without any fitting, Tool Shanks of every shape, including Round Twist Drills. When furnished with the Ratchet Attachment, for boring in places where the Sweep cannot be revolved, it is the only Brace which will answer that purpose. We have not changed the price for many years, and do not anticipate any change in the near future; but from year to year we have been adding to the quality so as to make the cost to us double what it was ten years ago. We have recently added to our manufacturing facilities, and are now prepared to supply the world with Braces.

LIST PRICES.

No. 10—14-inch Sweep, per dozen...\$33.00	No. 14—6-inch Sweep, per dozen...\$21.00
No. 11—12-inch Sweep, per dozen... 30.00	No. 31—12-inch Sweep, per dozen... 39.00
No. 12—10-inch Sweep, per dozen... 27.00	No. 32—10-inch Sweep, per dozen... 36.00
No. 13—8-inch Sweep, per dozen... 24.00	No. 33—8-inch Sweep, per dozen... 33.00

MILLERS FALLS CO., 74 Chambers St., New York.

HEATON & DENCKLA HARDWARE CO., Hardware Commission Merchants,

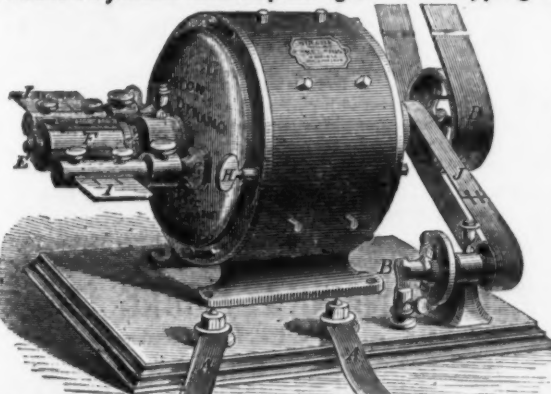
507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brass and Nickel-Plated.
WESTERN FILE CO.'S Cast-Steel Files.
AMERICAN SHEAR CO.'S Shears and Scissors.
HP NAIL COMPANY'S Wire, Steel, Iron and Brass Nails and Barbed Nails.
STEELE & SONS' Wrought Handle Sad Irons.

EXCELSIOR MILLS, Genuine Turkish Emery.
BROWN & BRO.'S Silver Plated Spoons and Forks.
GAYLORD MANUFACTURING CO.'S Tilt, Chest and Cupboard Locks.
AMES' Genuine A Chester Emery.
COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.
PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.
AMERICAN MACHINE CO.'S Fluters, &c.
STUART PETERSON & CO.'S Tinned and Enamelled Ware, &c.

Also a large line of Heavy and Shelf Hardware.

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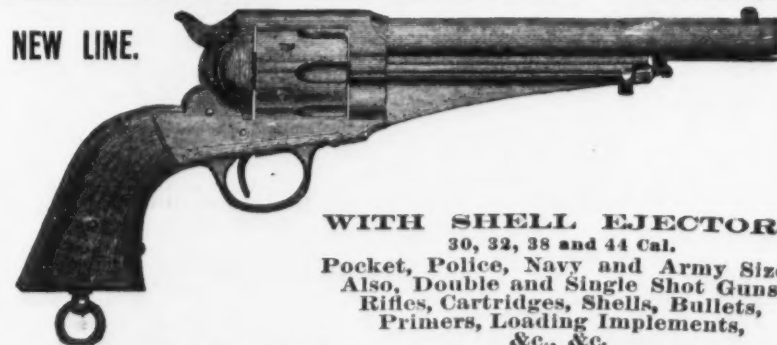
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Patented June 3, 1880.

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DIRECTIONS.—Tack the carpet at one side of the room, then go to the other side, and with the Stretcher draw the carpet into place, leaving the spur a few inches from the base-board. Take up the slack in the carpet under the spur and drive the spur gently into the floor; it will hold the carpet in place while you drive the tacks. Manufactured by

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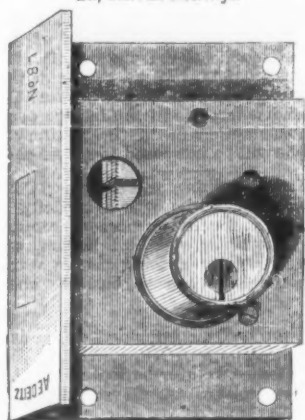
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METALLIC VENETIAN BLINDS.

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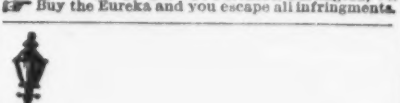
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LABOR AND WAGES.

The Western Window Glass Association, at a meeting recently held in Pittsburgh, are reported to have discussed the labor question at considerable length. It was claimed that Eastern glass was being sold in the West at a less price than Western-made glass could be sold at. Skilled labor in the East being from 20 to 25 per cent. lower than that of the same character in the West, has enabled the underselling. There was a disposition manifested to retaliate by placing large lots of glass in the Eastern markets, but no action was taken. It was resolved not to work in July and August, and all the manufacturers pledged themselves not to start up their factories after that time, unless wages in the East and West are equalized.

About fifty of the colored puddlers, helpers and heaters employed in the Black Diamond Steel Works, Pittsburgh, struck on Saturday last because three union puddlers were discharged the day before for refusing to work with a non-union helper. The members of the firm offer to confer with the strikers without reference to the Amalgamated Association, to which the strikers belong, but the latter state that they will not return to work until the discharged men are taken back, which will never be done, as Park Bros. & Co. refused, and always have, to re-employ a striker.

The trouble between the Pittsburgh Bessemer Steel Company, of Homestead, and their workmen, which has been alluded to before, has culminated in the arrest of a number of workmen. The suit is for damages, and in the petition presented to court it is alleged that the defendants, since they quit the employ of the company, have used every effort to intimidate the men employed in their places, and that for this reason the mill has been shut down and the plaintiffs subjected to serious damage. The defendants gave themselves up, and on being brought to Pittsburgh entered bail before Alderman Burke. The Amalgamated Association, of which they are members, will see that they are represented by counsel when the case comes to trial.

Since the furnaces at the new mill of the Phoenix Iron Company, at Phoenixville, have been in operation the puddlers have been making six heats for a day's work, which they could do in the same time it took them to make five heats in the old furnaces. Recently the workmen joined the Amalgamated Association. The association issued an order some time ago, stating that thereafter five heats would be considered a day's work, and forbidding any of its members from making more than that number. The Phoenixville branch of the association notified the Phoenix Iron Company that after last week they should drop one heat. This the company objected to, as it would leave the furnaces standing idle from four to five hours out of the twenty-four, which would be a great loss to them, as the consumption of coal during that time would be almost as great as when in operation. As the men were paid by the ton for all the iron they made, and as there had been no effort on the part of the employers to reduce the rates, the object of the move was not quite apparent to them. The company accordingly notified the puddlers that in case they persisted in this move they would be compelled to close their furnaces until other arrangements could be made. The puddlers held a meeting to take the matter into consideration, and resolved to obey the mandates issued from their headquarters. The company were notified of the decision, and masons were put to work walling up the furnaces, with the exception of one or two which were left to furnish heat for making steam to run the machinery in the mill. Last Monday morning the puddlers informed the company that they would accept the terms offered them, but owing to the absence of one of the managers no arrangement could be made.

At a meeting held in Pittsburgh recently, a gentleman from New England, who has been employed for several months in gathering statistics, states that he has found that the workmen of Pittsburgh received 25 to 75 per cent. higher wages than those in New England for the same kind of work. Yet the New England men live better and more comfortably, and the only reason he could give for it was that the large mills and factories of Pittsburgh are surrounded by beer saloons, in which the workmen spend most of their wages.

About 400 carriage makers are on strike at Rochester, N. Y.

A revival of the old Miners and Laborers' Union is now being agitated among the employees of the Delaware and Hudson Canal Co. Meetings are held at the various collieries, and at most of these men from distant places are present for the purpose of aiding in the matter of organization. However, nothing more has been done than to select delegates, who are to act as a grand committee to wait on the president of the company and make application for an advance of 20 per cent on the present wages.

The miners at the Home and Union mines, near Coshocton, Ohio, have struck against a reduction of 12½ cents per ton.

The Monongahela Republican says: We happened to see a recent pay roll of a coal works not far from this city, and copy a few of the items, showing the wages possible by good hands on a fair run: No. 4, 2192 bushels in 20 days, making \$3.84 per day; No. 21, 2360 bushels in 20 days, making \$4.13 per day; No. 27, 2525 bushels in 19 days, making \$4.65 per day; No. 34, 2030 bushels in 16 days, making \$4.45 per day; No. 57, 2289 bushels in 18 days, making \$4.32 per day. Of course, this is by no means a test; we do not publish it as such, but only to show that with steady work it is possible for miners to make extra good wages. The lowest man in 125 dug 2008 bushels in 18 days and made \$3.70 per day.

The stove-plate molders of Pittsburgh recently resolved to ask for an advance in wages of 10 per cent. On Monday the employers met and refused the advance, whereupon the molders went on strike and the foundries will be closed for an indefinite time.

No better example of the relations that should exist between labor and capital could be desired than is presented by the Columbus Buggy Company, Columbus, Ohio, perhaps

the largest concern of the kind in the world. The company treat their employees in a manner that insures the latter's best effort and cordial co-operation in the business.

Last week the stove manufacturers of Pittsburgh and Allegheny received a communication from their molders that unless an advance of 10 per cent. was granted immediately a strike would be inaugurated. Last Saturday the stove manufacturers held a meeting and decided that they would not grant the demand, and as a result the stove foundries of the two cities are idle, none of them firing up on Monday morning. "As you know," said a well-known member of the Stove Molders' Union to a reporter in conversation regarding the strike. "It embraces all the stove men in the two cities, who are controlled by the Iron Molders' Union No. 14. About 225 men are involved. Good molders can make from \$2.50 to \$3 a day, though the regular run of wages would average \$3 per day. The union that is controlling this strike is the oldest in the country, and has existed for 25 years. We are well organized and prepared to fight. At Filley's stove foundry in St. Louis, where there are more men employed than in all Pittsburgh, the union has spent \$22,000 in the past six months. I do not care to tell the molders' side of the story, unless the employers begin and open the ball. Of course the object is more money. Business is good, but rents are rising, and supplies are higher than ever. The last strike we had was about a year ago, and our men got their demands. No one figures as an agitator, but the strike was inaugurated by general consent. As to its duration, I do not think it will last over three or four days at the farthest, for the stove men cannot afford it." Mr. De Haven, one of the manufacturers, stated that the strike began on Monday morning; that about 300 men were involved altogether. Seven foundries were affected, viz.: A. Bradley & Co., Bissell & Co., Duncan & Baldwin, Crea, Graham & Co., Graff & Co., Anschutz & Co. and De Haven & Co. Mr. De Haven stated that the reason the stove men had refused to grant the advance was that they could not stand it, and again, that the men were receiving now the same prices they had received during the war, and at least 10 per cent. more than they received in any other city. What the outcome would be, Mr. De Haven could not say.—Pittsburgh Dispatch.

The Oldest File Concern in the United States.

The removal of the business of the J. Barton Smith Company to the new premises just completed for them in the north part of Philadelphia, is an event in the file trade, owing to the fact that they are the oldest file manufacturing house in the United States. The late J. Barton Smith, founder, and for thirty years head of the house, was for many years superintendent of Groves & Sons, of Sheffield. He came to this country in 1842, and immediately commenced the manufacture of files, with a determination to make goods equal, if not superior, to those for which his native town was so celebrated. For the greater part of the time he studied the wishes of his consumers, and coming into daily contact with them, was enabled to learn all the wants of the various workers in metals, &c., and to make a file meeting all requirements. Charles F. Cripps, nephew of the late J. Barton Smith, now president of the company, and who has been with the house thirty years, still gives his personal attention to all the details of manufacture. Mr. Gilbert Parker, who was with the house as salesman during seven years, and two years as partner, is now treasurer and general agent. Their new premises are very large and furnished with every convenience, and as they occupy three sides of a square, have abundance of light and air, from which they can never be shut out. Entering from Somerset street, the offices and packing rooms being to the right, we find the forging and annealing room, 40 x 100. Then the boiler and engine room, in which they have just placed a 100-horse-power engine from the Providence Steam Engine Company. The next department is the grinding shop, 40 x 50, and from that to what they claim to be the finest cutting shop in the United States, 40 x 100, adjoining which is the hardening shop, 40 x 50. The packing room is 30 x 40; counting house, 20 x 40; while the second floor, 40 x 50, is used as a machine shop, and the third floor used for saw shop, &c. The offices and rooms throughout are fitted up with every convenience, and besides being light and cheerful, are finished in remarkably good taste. The works will accommodate about 400 hands, and if the demand for files keeps up as it has for the past two or three years, the company expect at an early date to utilize their entire capacity.

A Strange Accident.—A singular accident happened in Cleveland, Ohio, 3d inst., at the Cleveland Rolling Mill Company's Bessemer Steel Works. One of the converters, manipulated by hydraulic power, was handled by a boy new at the business, and he let it tip so far that a large quantity of the melted metal poured out on the damp sand in the pit, producing a violent explosion which broke a great many panes of glass in the mill and adjacent building. Half a dozen men were more or less burned by flying metal, but only two severely—Robert Reardon and John Quigley—and they not fatally. Reardon was most hurt by running his head against an iron door trying to escape.

The House Committee on Naval Affairs on Monday heard Mr. Park, of Park Brothers & Co., of Pittsburgh; George R. Wilson, Superintendent of Machinery, Washington Navy Yard; Henry Winsor, manager of the Lay Torpedo Company, of New York; and Commanders Evans and Howison, U. S. N., members of the late Naval Advisory Board, on the building of new ships for the navy, and the most profitable material to be used in their construction. J. Edwin Sherman, metallurgist, of Boston, appeared in behalf of Messrs. Naylor & Co., who were invited by the committee to give their views on the manufacture of steel in this country

adapted to shipbuilding, and on Saturday he conducted a series of experiments at the Navy Yard in presence of the committee, to test the relative merits of steel and iron for shipbuilding.

The Treasury Department has been informed officially by the President of the Dominican Republic that from and after the 1st of January, 1882, the 34 per cent. that has heretofore been collected as per tariff on all merchandise imported from foreign countries for consumption in all the territory of the Republic will be increased to 40 per cent.

The Chicago Smelting and Refining Company are erecting works with a capacity of 40 tons per day, for the purpose of refining and separating silver and lead bullion, and will make a specialty of doing custom work. This company has been in business about eight years.

The Sultan had an interview a few days ago with the American Minister, Gen. Wallace, in reference to information required in respect to agriculture, and an order has since been sent to America for specimens of the most improved agricultural implements.

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FOR Heating and Purifying Water for Steam Boilers. Patented July 21 1877. Has Straight Tubes. SIMPLICITY, RELIABILITY and EFFICIENCY At Less Cost Than any Other. Write for prices and further information to the manufacturers, Lowe & Watson, BRIDGEPORT, CONN.

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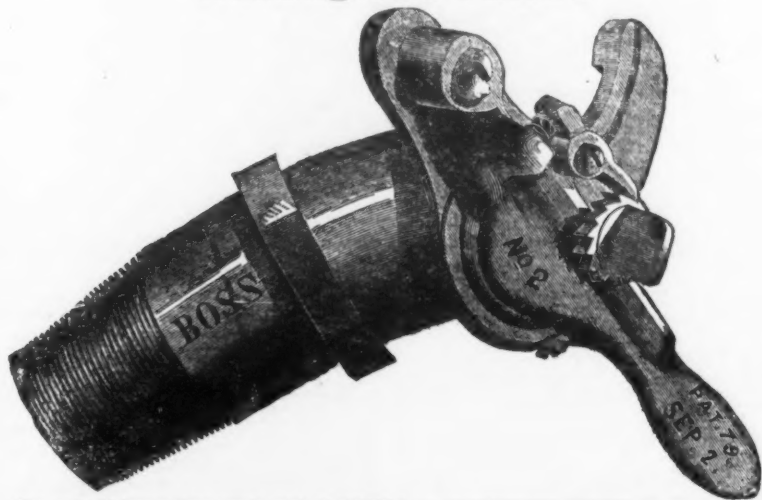
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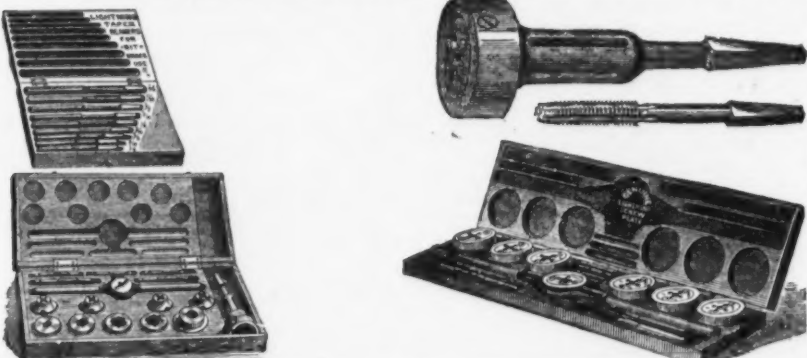
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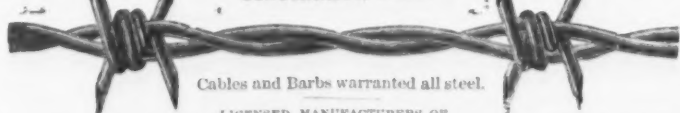
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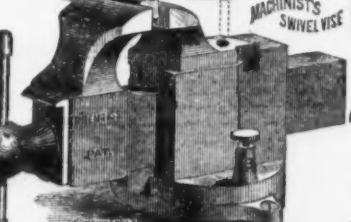
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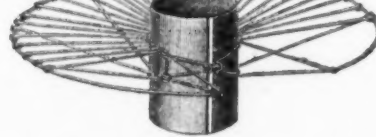
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As cheap as the best cast iron.

Snow and Ice cannot lodge on the Rail.

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CHAMPION HOG RINGER RINGS and HOLDER. Only double ring ever invented. The only Ring that will effectively keep Hogs from rooting. No sharp points in the nose. Use no other.

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New York Wholesale Prices, February 8, 1882.

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Butts.		
Cast Brass, Debut's	dis 62x0
Cast Brass, Corlies' Fast Joint	dis 50x0
Cast Brass, Loose Joint	dis 10x0
Fast Joint, Narrow	.....	dis 40x0
Fast Joint, Broad	.....	dis 50x0
Loose Joint	.....	dis 50x0
Loose Joint, Japanese	.....	dis 50x0
Loose Joint, with Acorn	.....	dis 50x0
Loose Joint, Japanned, with Acorns	.....	dis 50x0
Parliament Butts	.....	dis 50x0
Loose Pin, no Acorn	.....	dis 50x0
Loose Pin, Acorns	.....	dis 50x0
Loose Pin, Acorns, Japanned, Plated Tips	.....	dis 50x0
Wrought Iron.		
Fast Joint, Narrow	.....	dis 40x0
Fast Joint, L. Narrow	.....	dis 40x0
Fast Joint, Broad	.....	dis 50x0
Loose Joint, Broad	.....	dis 50x0
Inside Bolt, Hedge	.....	dis 40x0
Inside Bolt, Light	.....	dis 40x0
Loose Pin, Light	.....	dis 40x0
Loose Pin, Light	.....	dis 40x0
Spring Hinges		
Geer's Spring and Blank Butts	.....	dis 25x0
Union Spring, Parker & Acorn	.....	dis 25x0
Union Spring, Japanned	.....	dis 25x0
Union Spring, Ornamental	.....	dis 25x0
Union Spring, Japanned	.....	dis 25x0
American Spring Hinge Co.'s	.....	dis 25x0
Gem Spring Hinges	.....	dis 25x0
Union Spring Hinge Co.'s	.....	dis 25x0
Bommer's	.....	dis 25x0
Buckman's	.....	dis 25x0
Butts, Palmer	.....	dis 40x0
Butts, Seymour	.....	dis 70x0
Butts, Shepard	.....	dis 70x0
Butts, Shepherd's No. 50	.....	dis 70x0
Butts, Nicholson	.....	dis 50x0
Butts, Huffer	.....	dis 50x0
Butts, Sargent, No. 1	.....	dis 50x0
Butts, Sargent, No. 1, 3	.....	dis 50x0
Butts, Sargent, No. 17	.....	dis 70x0
Butts, Sargent's Gravity	.....	dis 70x0
Clark's Improved Shutter Hinge, Nos. 1, 1 1/2, 2, 2 1/2, 3	.....	dis 50x0
Bow Pins.		
Union Spring, Parker & Acorn	.....	dis 25x0
Union Spring, Japanned	.....	dis 25x0
Union Spring, Ornamental	.....	dis 25x0
Union Spring, Japanned	.....	dis 25x0
American Spring Hinge Co.'s	.....	dis 25x0
Gem Spring Hinges	.....	dis 25x0
Union Spring Hinge Co.'s	.....	dis 25x0
Bommer's	.....	dis 25x0
Buckman's	.....	dis 25x0
Butts, Palmer	.....	dis 40x0
Butts, Seymour	.....	dis 70x0
Butts, Shepard	.....	dis 70x0
Butts, Shepherd's No. 50	.....	dis 70x0
Butts, Nicholson	.....	dis 50x0
Butts, Huffer	.....	dis 50x0
Butts, Sargent, No. 1	.....	dis 50x0
Butts, Sargent, No. 1, 3	.....	dis 50x0
Butts, Sargent, No. 17	.....	dis 70x0
Butts, Sargent's Gravity	.....	dis 70x0
Clark's Improved Shutter Hinge, Nos. 1, 1 1/2, 2, 2 1/2, 3	.....	dis 50x0
Bow Pins.		
Union Spring, Parker & Acorn	.....	dis 25x0
Union Spring, Japanned	.....	dis 25x0
Union Spring, Ornamental	.....	dis 25x0
Union Spring, Japanned	.....	dis 25x0
American Spring Hinge Co.'s	.....	dis 25x0
Gem Spring Hinges	.....	dis 25x0
Union Spring Hinge Co.'s	.....	dis 25x0
Bommer's	.....	dis 25x0
Buckman's	.....	dis 25x0
Butts, Palmer	.....	dis 40x0
Butts, Seymour	.....	dis 70x0
Butts, Shepard	.....	dis 70x0
Butts, Shepherd's No. 50	.....	dis 70x0
Butts, Nicholson	.....	dis 50x0
Butts, Huffer	.....	dis 50x0
Butts, Sargent, No. 1	.....	dis 50x0
Butts, Sargent, No. 1, 3	.....	dis 50x0
Butts, Sargent, No. 17	.....	dis 70x0
Butts, Sargent's Gravity	.....	dis 70x0
Clark's Improved Shutter Hinge, Nos. 1, 1 1/2, 2, 2 1/2, 3	.....	dis 50x0
Bow Pins.		
Union Spring, Parker & Acorn	.....	dis 25x0
Union Spring, Japanned	.....	dis 25x0
Union Spring, Ornamental	dis 25x0
Union Spring, Japanned	dis 25x0
American Spring Hinge Co.'s	dis 25x0
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Union Spring Hinge Co.'s	dis 25x0
Bommer's	dis 25x0
Buckman's	dis 25x0
Butts, Palmer	dis 40x0
Butts, Seymour	.....	dis 70x0
Butts, Shepard	.....	dis 70x0
Butts, Shepherd's No. 50	.....	dis 70x0
Butts, Nicholson	.....	dis 50x0
Butts, Huffer	.....	dis 50x0
Butts, Sargent, No. 1	.....	dis 50x0
Butts, Sargent, No. 1, 3	.....	dis 50x0
Butts, Sargent, No. 17	.....	dis 70x0
Butts, Sargent's Gravity	dis 70x0
Clark's Improved Shutter Hinge, Nos. 1, 1 1/2, 2, 2 1/2, 3	dis 50x0
Bow Pins.		
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Bommer's	dis 25x0
Buckman's	dis 25x0
Butts, Palmer	dis 40x0
Butts, Seymour	dis 70x0
Butts, Shepard	dis 70x0
Butts, Shepherd's No. 50	dis 70x0
Butts, Nicholson	dis 50x0

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Lockery Firm Chisel, assorted, ½ gross, \$4.50	
Apple Firm Chisel, large, ½ gross, 5.00	
Apple Firm Chisel, small, ½ gross, 4.00	
Sackett Firm Chisel, assorted, ½ gross, 3.00	do 10
Sackett Framing Chisel, assorted, ½ gross, 5.00	do 10
Cherry, ½ gross, 5.00	do 10
Auger, assorted, ½ gross, 5.00	
Auger, large, ½ gross, 7.00	
Patent Auger, Douglas's, ½ gross, 25.00	do 25
Patent Auger, Swan's, ½ gross, 25.00	do 25
Barn Door, old pattern, ½ gross, 60.00	do 60
Barn Door, New England, ½ gross, 60.00	do 60
Champion, ½ gross, 10.00	do 10
Limax (Anti-Friction), ½ gross, 50.00	do 50
Linting Improved (Anti-Friction), ½ gross, 50.00	do 50
Kidder's, ½ gross, 50.00	do 50
4 in., 12 in., 15 in., 18 in., 20 in., 22 in., 24 in., 26 in., 28 in., 30 in., 32 in., 34 in., 36 in., 38 in., 40 in., 42 in., 44 in., 46 in., 48 in., 50 in., 52 in., 54 in., 56 in., 58 in., 60 in., 62 in., 64 in., 66 in., 68 in., 70 in., 72 in., 74 in., 76 in., 78 in., 80 in., 82 in., 84 in., 86 in., 88 in., 90 in., 92 in., 94 in., 96 in., 98 in., 100 in., 102 in., 104 in., 106 in., 108 in., 110 in., 112 in., 114 in., 116 in., 118 in., 120 in., 122 in., 124 in., 126 in., 128 in., 130 in., 132 in., 134 in., 136 in., 138 in., 140 in., 142 in., 144 in., 146 in., 148 in., 150 in., 152 in., 154 in., 156 in., 158 in., 160 in., 162 in., 164 in., 166 in., 168 in., 170 in., 172 in., 174 in., 176 in., 178 in., 180 in., 182 in., 184 in., 186 in., 188 in., 190 in., 192 in., 194 in., 196 in., 198 in., 200 in., 202 in., 204 in., 206 in., 208 in., 210 in., 212 in., 214 in., 216 in., 218 in., 220 in., 222 in., 224 in., 226 in., 228 in., 230 in., 232 in., 234 in., 236 in., 238 in., 240 in., 242 in., 244 in., 246 in., 248 in., 250 in., 252 in., 254 in., 256 in., 258 in., 260 in., 262 in., 264 in., 266 in., 268 in., 270 in., 272 in., 274 in., 276 in., 278 in., 280 in., 282 in., 284 in., 286 in., 288 in., 290 in., 292 in., 294 in., 296 in., 298 in., 300 in., 302 in., 304 in., 306 in., 308 in., 310 in., 312 in., 314 in., 316 in., 318 in., 320 in., 322 in., 324 in., 326 in., 328 in., 330 in., 332 in., 334 in., 336 in., 338 in., 340 in., 342 in., 344 in., 346 in., 348 in., 350 in., 352 in., 354 in., 356 in., 358 in., 360 in., 362 in., 364 in., 366 in., 368 in., 370 in., 372 in., 374 in., 376 in., 378 in., 380 in., 382 in., 384 in., 386 in., 388 in., 390 in., 392 in., 394 in., 396 in., 398 in., 400 in., 402 in., 404 in., 406 in., 408 in., 410 in., 412 in., 414 in., 416 in., 418 in., 420 in., 422 in., 424 in., 426 in., 428 in., 430 in., 432 in., 434 in., 436 in., 438 in., 440 in., 442 in., 444 in., 446 in., 448 in., 450 in., 452 in., 454 in., 456 in., 458 in., 460 in., 462 in., 464 in., 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688 in., 690 in., 692 in., 694 in., 696 in., 698 in., 700 in., 702 in., 704 in., 706 in., 708 in., 710 in., 712 in., 714 in., 716 in., 718 in., 720 in., 722 in., 724 in., 726 in., 728 in., 730 in., 732 in., 734 in., 736 in., 738 in., 740 in., 742 in., 744 in., 746 in., 748 in., 750 in., 752 in., 754 in., 756 in., 758 in., 760 in., 762 in., 764 in., 766 in., 768 in., 770 in., 772 in., 774 in., 776 in., 778 in., 780 in., 782 in., 784 in., 786 in., 788 in., 790 in., 792 in., 794 in., 796 in., 798 in., 800 in., 802 in., 804 in., 806 in., 808 in., 810 in., 812 in., 814 in., 816 in., 818 in., 820 in., 822 in., 824 in., 826 in., 828 in., 830 in., 832 in., 834 in., 836 in., 838 in., 840 in., 842 in., 844 in., 846 in., 848 in., 850 in., 852 in., 854 in., 856 in., 858 in., 860 in., 862 in., 864 in., 866 in., 868 in., 870 in., 872 in., 874 in., 876 in., 878 in., 880 in., 882 in., 884 in., 886 in., 888 in., 890 in., 892 in., 894 in., 896 in., 898 in., 900 in., 902 in., 904 in., 906 in., 908 in., 910 in., 912 in., 914 in., 916 in., 918 in., 920 in., 922 in., 924 in., 926 in., 928 in., 930 in., 932 in., 934 in., 936 in., 938 in., 940 in., 942 in., 944 in., 946 in., 948 in., 950 in., 952 in., 954 in., 956 in., 958 in., 960 in., 962 in., 964 in., 966 in., 968 in., 970 in., 972 in., 974 in., 976 in., 978 in., 980 in., 982 in., 984 in., 986 in., 988 in., 990 in., 992 in., 994 in., 996 in., 998 in., 1000 in., 1002 in., 1004 in., 1006 in., 1008 in., 1010 in., 1012 in., 1014 in., 1016 in., 1018 in., 1020 in., 1022 in., 1024 in., 1026 in., 1028 in., 1030 in., 1032 in., 1034 in., 1036 in., 1038 in., 1040 in., 1042 in., 1044 in., 1046 in., 1048 in., 1050 in., 1052 in., 1054 in., 1056 in., 1058 in., 1060 in., 1062 in., 1064 in., 1066 in., 1068 in., 1070 in., 1072 in., 1074 in., 1076 in., 1078 in., 1080 in., 1082 in., 1084 in., 1086 in., 1088 in., 1090 in., 1092 in., 1094 in., 1096 in., 1098 in., 1100 in., 1102 in., 1104 in., 1106 in., 1108 in., 1110 in., 1112 in., 1114 in., 1116 in., 1118 in., 1120 in., 1122 in., 1124 in., 1126 in., 1128 in., 1130 in., 1132 in., 1134 in., 1136 in., 1138 in., 1140 in., 1142 in., 1144 in., 1146 in., 1148 in., 1150 in., 1152 in., 1154 in., 1156 in., 1158 in., 1160 in., 1162 in., 1164 in., 1166 in., 1168 in., 1170 in., 1172 in., 1174 in., 1176 in., 1178 in., 1180 in., 1182 in., 1184 in., 1186 in., 1188 in., 1190 in., 1192 in., 1194 in., 1196 in., 1198 in., 1200 in., 1202 in., 1204 in., 1206 in., 1208 in., 1210 in., 1212 in., 1214 in., 1216 in., 1218 in., 1220 in., 1222 in., 1224 in., 1226 in., 1228 in., 1230 in., 1232 in., 1234 in., 1236 in., 1238 in., 1240 in., 1242 in., 1244 in., 1246 in., 1248 in., 1250 in., 1252 in., 1254 in., 1256 in., 1258 in., 1260 in., 1262 in., 1264 in., 1266 in., 1268 in., 1270 in., 1272 in., 1274 in., 1276 in., 1278 in., 1280 in., 1282 in., 1284 in., 1286 in., 1288 in., 1290 in., 1292 in., 1294 in., 1296 in., 1298 in., 1300 in., 1302 in., 1304 in., 1306 in., 1308 in., 1310 in., 1312 in., 1314 in., 1316 in., 1318 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[illegible]

Razor Straps.	
Genuine Emerson.....	dis 60 @ 65
Badger's Emerson.....	dis 40 @ 45
Evans' (not Emerson).....	dis 35 @ 40
Imitation Emerson.....	dis 20 @ 25
Hunt's.....	dis 15 @ 20
Chapman's.....	dis 10 @ 15
Saunders'.....	dis 10 @ 15
Torrey's.....	dis 10 @ 15
Rivets.	
Iron and Tinned, new list, Dec. 10, 1881.....	dis 40
In bulk, new list, Dec. 10, 1881.....	dis 35
Copper Rivets and Bolts.....	dis 35
Non-ferrous.....	dis 35
Rivet Sets.	
Non-ferrous.....	dis 40
Rods.	
Star, Brass.....	dis 25
Star, Black Walnut.....	dis 20
Star, American Patent.....	dis 20
Reels.	
Barn Door, Sargent's List.....	dis 60 @ 100
Acme (Anti-Friction).....	dis 50
Rope.	
Manila, Net List, Oct. 5, 1881, dis on 5000 lb and over.....	dis 15
Manila, 1/2 inch and larger.....	dis 15
Manila, 1/4 inch.....	dis 15
Manila, 1/8 inch.....	dis 15
Manila, 1/16 inch.....	dis 15
Manila, 1/32 inch.....	dis 15
Manila, 1/64 inch.....	dis 15
Manila, 1/128 inch.....	dis 15
Manila, 1/256 inch.....	dis 15
Manila, 1/512 inch.....	dis 15
Manila, 1/1024 inch.....	dis 15
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Manila, 1/4096 inch.....	dis 15
Manila, 1/8192 inch.....	dis 15
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NEW YORK WHOLESALE PRICES, February 8, 1882.

METALS.

IRON.—DUTY. Bars, 1 to 1½ in. Sheet, Band and Hoop and Scoll, 14 to 1½ in. provided that none of the above iron shall pay a less rate of duty than 10 per cent. Pig, 8 to 10 in. Polished Sheet, 30 in. Wrought Scrap, 8 to 10 in. Cast Scrap, 8 to 10 in. Railroad, 7 to 10 in. Boiler and Plate, 1½ in. to 1 in.

American Iron.
Foundry, No. 1, 10 in. 27.00
Foundry, No. 2, 10 in. 25.00
Gray Forge, 10 in. 24.00

Scotch Iron.
Edinburgh, 10 in. 24.50
Carbide (to arrive), 10 in. 24.00
Columbus, 10 in. 27.75
Cincinnati, 10 in. 26.50
Gartsherrie (to arrive), 10 in. 26.50
English Iron, 10 in. 26.50

Rails.
Iron, a mill, 10 in. 24.00
Steel, at mill (to arrive), 10 in. 27.00
Old Rails, 10 in. 24.00
Old Rails, 10 in. 24.00

Scrap.
Wrought Scrap, 10 in. 24.00
Wrought Scrap, 10 in. 24.00

Star Iron from Store.
Common Iron, 10 in. 24.00
10 in. 24.00

Refined Iron.
10 in. 24.00
10 in. 24.00

Sheet Iron.
Common, 10 in. 24.00
American, 10 in. 24.00

Nos. 10 to 20.
10 in. 24.00
10 in. 24.00

Galvanized.
10 in. 24.00
10 in. 24.00

Patent.
10 in. 24.00
10 in. 24.00

British.
10 in. 24.00
10 in. 24.00

OPPER.—DUTY. 10 in. 24.00
10 in. 24.00

American.
10 in. 24.00
10 in. 24.00

BRASS.—DUTY. 10 in. 24.00
10 in. 24.00

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OPPER.—DUTY. 10 in. 24.00
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British.
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10 in. 24.00

OPPER.—DUTY. 10 in. 24.00
10 in. 24.00

American.
10 in. 24.00
10 in. 24.00

All Mandrel Drawn Tubes under ½ in. 1 cent per pound advance.

ZINC TUBING.—dis. 25.
Plain, 10 in. 24.00
Fancy, 10 in. 24.00

GERMAN SILVER TUBING.—dis. 10.
Plain, 10 in. 24.00
Fancy, 10 in. 24.00

STEELE.—DUTY. Bars, Ingots, Sheets and Coils, 10 in. 24.00
10 in. 24.00

For American Steel see quotations under heading of Pittsburgh.

English Steel.
Best Cast, 10 in. 24.00
Extruded, 10 in. 24.00

Swaged, Cast.
Best Double Shear, 10 in. 24.00
Riveter, 10 in. 24.00

German Steel, Best.
2d quality, 10 in. 24.00
3d quality, 10 in. 24.00

Sheet Cast Steel, 1st quality.
2d quality, 10 in. 24.00
3d quality, 10 in. 24.00

ANTONIN.
10 in. 24.00
10 in. 24.00

LEAD.—DUTY. Pig, 10 in. 24.00
10 in. 24.00

For American Lead see quotations under heading of Pittsburgh.

English Lead.
Best Cast, 10 in. 24.00
Extruded, 10 in. 24.00

Swaged, Cast.
Best Double Shear, 10 in. 24.00
Riveter, 10 in. 24.00

German Steel, Best.
2d quality, 10 in. 24.00
3d quality, 10 in. 24.00

Sheet Cast Steel, 1st quality.
2d quality, 10 in. 24.00
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Swaged, Cast.
Best Double Shear, 10 in. 24.00
Riveter, 10 in. 24.00

German Steel, Best.
2d quality, 10 in. 24.00
3d quality, 10 in. 24.00

FRUITING.
Gum, White, 10 in. 24.00
Gum, Sheet, 10 in. 24.00

Gum, Copal.
10 in. 24.00
10 in. 24.00

Gum, Shellac.
10 in. 24.00
10 in. 24.00

Gum, Turpentine.
10 in. 24.00
10 in. 24.00

Gum, Rosin.
10 in. 24.00
10 in. 24.00

Gum, Pitch.
10 in. 24.00
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Gum, Putty.
10 in. 24.00
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Gum, Waste.
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Gum, Waste.
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HERMANN BOKER & CO.,



PERFECTION WINDOW CLEANER CO.
TO THE TRADE.
Our price list for 1882 will be,
No. 1. 2. 3. 4. 5. 6.
Size, 7 inch. 8. 10. 12. 14. 18.
Price, 30 cents, 35, 40, 45, 50, 75 each.
Discounts.—1 Gr. 25; 5, 30; 10, 35 per cent.

PERFECTION WINDOW CLEANER CO. Chicago, Ill. U. S. A.

JARVIS PATENT FURNACE
For Setting Steam Boilers.
Economy of Fuel, with increased capacity of steam power.
The same principle as the STEAMERS PROCESS OF MAKING STEEL, utilizes the waste gases with hot air on top of the fire. Will burn all kinds of Waste Fuel without a blast, including screenings, wet peat, wet hops, sawdust, logwood chips, slack coal, &c.
Send for circular.
A. F. UPTON, General Agent.
7 Oliver Street (P. O. Box 341), BOSTON, MASS.

TUFTING BUTTON
PATENTED June 28, 1881.
THE AMERICAN TACK CO., Fairhaven, Mass.,
Are making TUFTING BUTTONS with every Eye Soldered to its Back, giving them great Strength and Durability. All Buttons are guaranteed satisfactory. Also Lining and Saddle Nails, and every variety of
TACKS and NAILS.
New York Salesroom, 116 Chambers Street

'RAPID TRANSIT' TRAP
Has no superior, and is a sure and certain catcher of Mice. With the Metal Platform resting on wood bottom of Trap, an invitation is always extended to Mice of whatever "kind, color or condition of race," into secure and grated quarters, from which they are released by opening cover of Trap and depositing contents into a pail of water.
The Mice go in at a rapid rate, And each one sets it for his mate.
Patented August 27, 1878.
Manufactured by
THE SMITH & EGGE MANUFACTURING CO., Bridgeport, Conn.
GOODSELL'S WHITE MOUNTAIN POTATO PARER.
Patented June 14, 1881.

The White Mountain Potato Parer is the only machine ever made that will not only pare a potato much better than it can be done by hand, taking off a thinner paring from every shape or kind of potato, but will go into and clean out the eyes, and altogether at a saving of at least 20 per cent. It is free from the objections made to the old style of rattletrap, geared parers; is solid and substantial, cannot get out of order, and so cheap as to be within the means of everybody.
Almost any of the Potato Parers in the market seem as if they might do the work better "next time," but the "White Mountain" DOES IT NOW.
Every Machine warranted as represented.
Price to the Trade, \$7.50 per dozen.
GOODSELL CO., Antrim, N. H., Sole Manuf'rs.

PERFORATED SHEET METALS.
For Coal and Ore Separators, Revolving Screens, Jigs, Washers, Stamp Batteries, Mining and Smelting Works, Silver Reduction and Concentrating Works, &c.
For Centrifugals, Brewing, Distilling, Wool and Sugar Machinery, Purifier Trays for Gas Works, Coal and Coke Works, Flour, Cotton, Oil, Paper and Pulp Mills, &c.
Iron, Steel, Copper, Brass, Zinc and other metals punched to any size and thickness, for all uses.
HARRINGTON & OGLESBY CO.
Nos. 43, 45 & 47, South Jefferson St., CHICAGO, ILL.
Special discounts to the trade. Correspondence solicited.

BAEDER, ADAMSON & CO.,
Manufacturers of SAND & EMERY PAPER & EMERY CLOTH.
(Also in Rolls, for machine work.)
Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felt-ing for Covering Boilers, Pipes, &c., Cow Hide Whips.
Stores: PHILADELPHIA, 730 Market St., BOSTON, 143 Milk St., NEW YORK, 67 Beekman St., CHICAGO, 182 Lake St.

WHEELING HINGE CO.,
WHEELING, W. VA., MANUFACTURERS OF
Wrought Iron Butts, Wrought Hooks, Hasps, Rings, Gate Latches, Staples, &c.,
Repair Links, Washers, Wagon Bow Staples, Fire Shovels and Pokers, Wrought Iron Garden Rakes and General Blacksmith Work.

CINCINNATI ROLLING MILLS AND CHAIN WORKS
Manufacture Traces, Coil, Ox, Log and Wagon Chain, Fifth Wheels, Shackles and King Bolts, using only Iron made at our mills from strictly selected Wrought Scrap.
OFFICE, 30 West Third Street. MILLS & WORKS, Geor & C. H. & D. B. R.

B. KREISCHER & SONS,
FIRE BRICK.
BEST AND CHEAPEST.
Established 1845.
Office, foot of Houston Street, East River, NEW YORK.
NEWTON & CO.,
ALBANY, N. Y., Manufacturers of
FIRE BRICK
Stove Linings,
Range and Heater Linings.
Cylinder Brick, &c., &c.
English, Scotch and Welsh
FIRE BRICKS,
Dimes and Silica Bricks for Glass and Steel Works.
S. A. RIMINGTON,
10 and 42 Broadway, New York.
Yard foot of 4th St., Hoboken, N. J.

M. D. Valentine & Bro
Manufacturers of
FIRE BRICK
And Furnace Blocks
DRAIN PIPE & LAND TILE.
Woodbridge, - - - N. J.

BORGNER & O'BRIEN,
Manufacturers
FIRE BRICK
AND
Edge Pressed Furnace Blocks,
CLAY RETORTS, TILES, &c.,
Twenty-third Street,
PHILADELPHIA.
Twenty years' practical Experience.

WATSON FIRE BRICK CO.,
ESTABLISHED 1856.
Successors to JOHN R. WATSON, Perth Amboy, New Jersey
Manufacturers of
FIRE BRICK,
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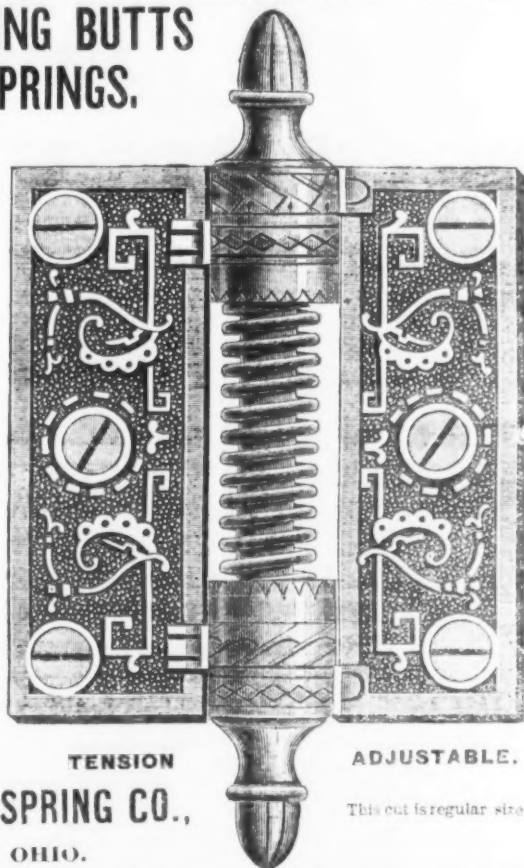
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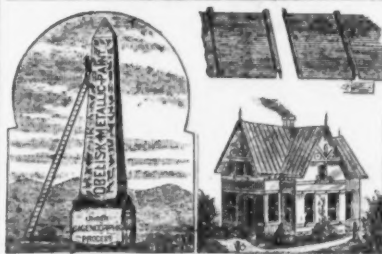
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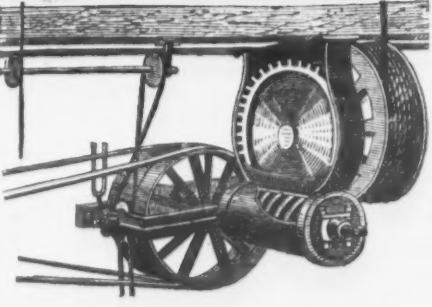


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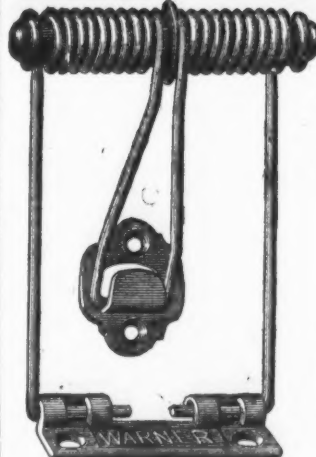
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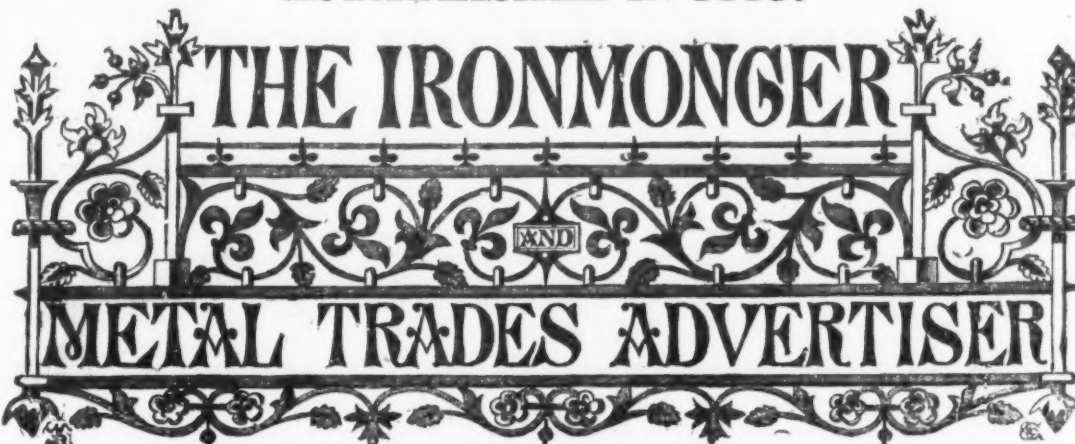
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THE WHOLE FOREIGN HARDWARE TRADE

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or advertisement inserted in the *Ironmonger* and *Foreign Supplement* is a strikingly powerful and most efficient way of publicity not to be compared with any other ordinary channels of communication.

HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,
Front and Laurel Streets, PHILADELPHIA.

DISSTON'S SAMSON TREE PLANTER AND POST HOLE DIGGER.

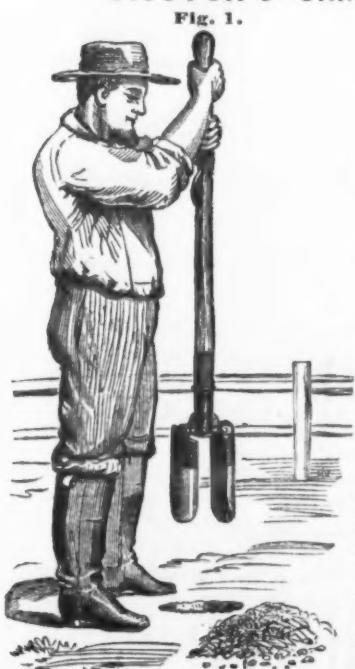


Fig. 1.

Patented May 29, 1870.

Price, - - - \$37.50 per dozen.

No Farmer, Nurseryman, Railroad
or Telegraph Company
SHOULD BE WITHOUT ONE.

NO BACK-ACHE.

NO KNEE-WORK.

NO CLOGGING.

This tool has been thoroughly tested, and has given the greatest satisfaction to all who have tried it. The principle on which it works makes it self-cleaning and prevents adhesion in sticky soil; therefore it always works free and easy. It is far superior to all plungers, augers and boring machines, as it works well in stony, sandy, or clay soils; quicksand under water is as easily removed as though no water existed.

DIRECTIONS.

Plunge the Digger into the ground, as shown in cut, Fig. 1, and when the soil is loosened pull out the lever with one hand, as shown in cut, Fig. 2, which will press the dirt between the blades; then draw the Digger from the hole, keeping hold of the lever with one hand and the handle with the other. When the Digger is clear of the hole, you can deposit the load anywhere within reach by simply pressing down the lever, which will open the blades and the dirt will fall from between them. The Digger is then ready for another plunge. The steel blades are nine inches long, and the whole tool five feet long. For sale at Hardware and Agricultural Stores.

HENRY DISSTON & SONS.

BROWER & LEEDS,

No. 81 Murray Street, New York.

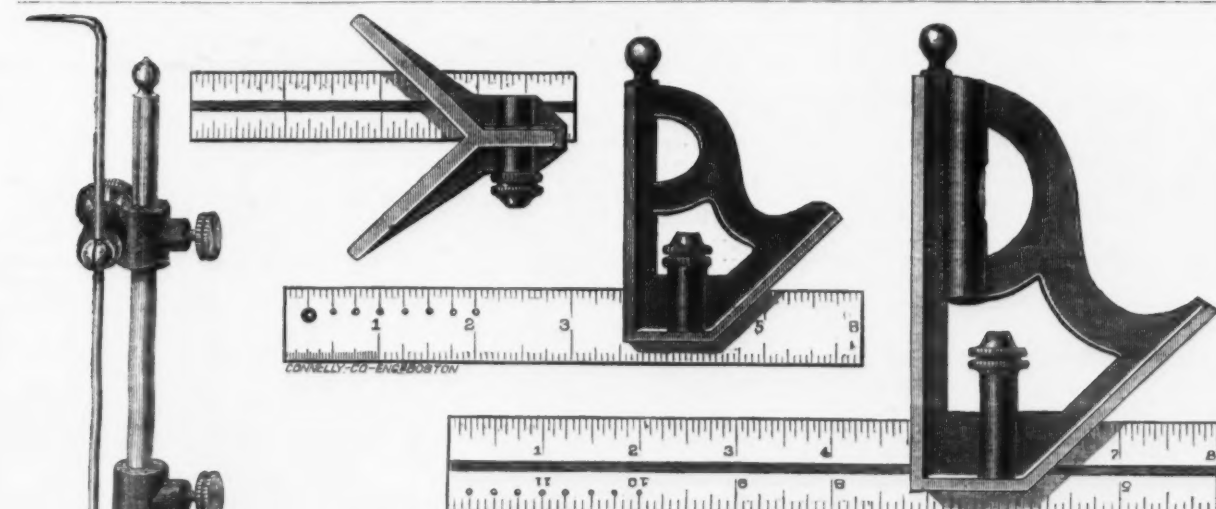
Hardware Manufacturers' Agents, and Headquarters for

HORSE SHOES, HORSE NAILS, TOE CALKS, CALKING STEEL,

Bayliss' Bellows, Forges and Tuyeres,

Horseshoers' Pincers, Sledges,

FITTING AND DRIVING HAMMERS,



Starrett's Improved SURFACE GAUGE!

Can be quickly and accurately adjusted to
lay out work for every conceivable purpose a
gauge is used for.

L. S. STARRETT, Athol, Mass.

PATENTEE AND SOLE MANUFACTURER.

Send for Catalogue.

FRASSE & CO., Agents (P. O. Box 879), 62 Chatham St., New York.

CAUTION.

This is to inform the public that since the success of my Patent Squares has become known, unprincipled parties have had the foolhardiness to make them, under the Pretext of Chaplin's Patent. Having commenced suit against said parties, I shall soon put a stop to their manufacture, and shall hold all selling or using them responsible.

Respectfully,
L. S. STARRETT.

R. P. SCOTT & CO.,
25 Orange Street, Newark, New Jersey,
Manufacturers of
ROTARY KNIFE PEACH PARERS, GOLD MEDAL APPLE
PARERS, SAFETY REVERSIBLE ICE CREEPERS, EGG
BEATERS, MELTING LADLES, &c. Also,
Scott's Peach-Pitting Machines.

CHAINS

MILLER CHAIN CO., Akron, O.
Coil, Cable, Crane, and
Agricultural Chains.

209 & 211 College St. BURLINGTON, VT.

PORTER MANUFACTURING COMPANY.

MANUFACTURERS OF

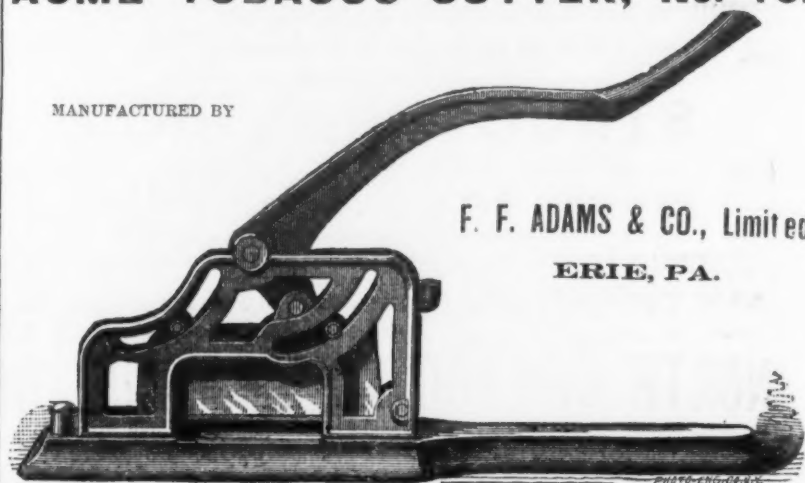
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EVERY ONE HIS OWN WINDOW & DOOR SCREEN MAKER.
NO MORTISING OR TENONING, CANNOT SAG OR WARP.
AND ANYONE CAN MAKE THEM. SEND FOR PRICE LIST.

NEW YORK, BY GRAHAM & HAINES. 113 CHAMBERS ST.
CHICAGO, BY W. PICKETT & SON. 164 LAKE ST.

ACME TOBACCO CUTTER, No. 10.

MANUFACTURED BY

F. F. ADAMS & CO., Limited
ERIE, PA.

Amesbury's Band Saw Filing Machine.

Will Save its Cost in a Few Weeks.

Any boy that can turn a crank can file a band saw in from five to ten minutes more accurately than an expert filer can do the same by hand in one hour. Keeps the teeth even and level, and enables the saw to do more and better work with much less strain. Pronounced by users to be the best labor-saving machine ever introduced.

First Premium and Diploma of St. Louis Agricultural and Mechanical Association, 1881, awarded for

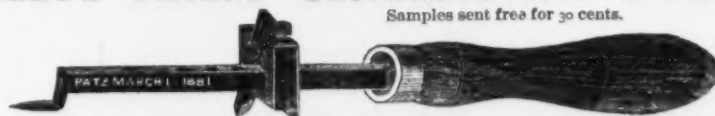
BEST BAND SAW FILING MACHINE.

Is sold at a price within the reach of every one using a band saw. Reduced Price List.—Net price, including 20 files, 1/2" thin, corner and 1 facing files, per dozen, \$1.20; thick beveled files, per dozen, \$1.80. Terms strictly cash. Send for Catalogue and Testimonials.

G. W. AMESBURY & CO.,
3101 and 3103 Chestnut Street,
Philadelphia, Pa.

HENRY'S PATENT UNIVERSAL CAN OPENER.

Samples sent free for 30 cents.



Territorial Rights for Sale.

The verdict of all: "The best in the market."

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THE "MOUNT CARMEL" OX SHOE.

Steel Toe Calk.

FINISHED READY FOR NAILING ON.

WARRANTED

The Best and Cheapest Shoe Made.

IVES, WOODRUFF & CO.

Manufacturers,

MOUNT CARMEL, CONN.

For sale by dealers in blacksmiths' supplies.

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FINE GRAY IRON CASTINGS OF EVERY DESCRIPTION.

Rosettes and Pickets for Wire Workers, Castings for Furniture and Piano

Manufacturers. Iron and Metal Patterns of all kinds a Specialty.

Correspondence solicited for all kinds of castings.

PURE TURKISH EMERY,

Quartz, Pumice and Rotten Stone, Crocus, Rouge, Glue, Sand

Paper, Emery Paper and Cloth, Emery Wheels, &c.

WALPOLE EMERY MILLS,

Mills, So. Walpole. 114 MILK ST., BOSTON, MASS.

NIAGARA STAMPING & TOOL CO.,

Manufacturers of

Presses, Dies and Tools for Working Sheet Metal,

FRUIT CAN AND TINNERS' TOOLS, &c.

Works, 147 and 149 Elm Street, near Clinton Street, BUFFALO, N. Y.

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Please notice that we have removed from No. 295 THIRD AVENUE to

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Where we hope to be favored with a continuance of your generous patronage.J. M. FARRINGTON & CO.,
Successors to DAY, FARRINGTON & CO., Manufacturers ofLOCKS, KNOBS, GONGS, BLANK KEYS,
Wrought Store Door and Flush Bolts, Silver Plated, Ornamental Bronze and other Hardware.

PHILADELPHIA.

Corrected Weekly by Lloyd, Supplee & Walton.

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.
 Peter Wright, & Co. 110
 Over 200 lbs. 115.00
 Eagle (American) 100 # 110.00

Apple Parers.
 Penn Apple Parer 86.50
 Rotary French Parer 13.50
 Lots of 10 to 25 dozen special price.

Axes.
 Hunt's Kentucky and Yankee per doz \$10.00 @ 10.50
 Mann's Ren Warrior 9.00 @ 10.00
 Richmond Chief 9.00 @ 10.00
 Beveled Axes 9.00 @ 10.00
 Double Bit Axes 9.00 @ 10.00

Augers and Auger Bits.—New List January 1.
 Baker's Nut Auger 40¢
 Cook's Auger 40¢
 Watson's Ship Auger 40¢
 Benjamin Pierce Auger 40¢
 Griswold Auger Bits 40¢
 "Cook's" 40¢
 Jennings 40¢
 Housley's Pat. Hol. Augers, list \$48 # doz. 40¢
 Stearns' Pat. Hol. Augers, list \$48 # doz. 40¢
 Light and Common 40¢

Bells.
 Bevin Bros. Mfg. Co. Light Hand Bells 66¢
 Swiss Pattern Hand Bells 66¢
 Connell's Door Bells 66¢
 "Western & Kentucky Cow, new list 50¢
 Holt and Hivet Clippers 66¢
 Chambers' No. 1 for 1/2 volt 9.00 @ 10.00
 "No. 2 9.00 @ 10.00
 "No. 3 9.00 @ 10.00

Boiler Machines.
 Spright, without Augers 67¢
 Angular, without Augers 67¢

Bolts.—Eastern Carriage Bolts 66¢
 Philadelphia new list 70¢
 Stanley Wrought Shutter 66¢
 "Barber's" 66¢
 Backus 66¢
 Spofford 66¢
 American Rail 66¢

Buttresses.—Cast Fast Joint, Narrow 40¢
 "Broad 40¢
 "Acorn Loose Pin 40¢
 "Mayer's Loose Joint 40¢
 Wrought Loose Pin 40¢
 Table Hinges and Back Flaps 40¢
 "Narrow, Fast 40¢
 "Loose Joint 40¢

Blind Butts.
 Parker 40¢
 Clark 40¢
 Shepard 40¢
 Lull & Porter 40¢
 Huffer's 40¢

Chains.—German Butter and Coll. list December 31.
 1881 5¢
 Galvanized Pump 5¢
 Best Proof Coll Chain—English 5¢

Chisels.—Socket Framing 66¢
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 "Butcher's 66¢
 "Bed (new list July 1, 1882) 66¢
 "Plate 66¢
 "Box and Side, new list Jan. 1, 1882 66¢

Coffin Mills.—Box and Side, new list Jan. 1, 1882 66¢
 "Box and Side, new list Jan. 1, 1882 66¢
 "Box and Side, new list Jan. 1, 1882 66¢

Cutlery.—Walden Pocket 66¢
 "Walden Pocket 66¢
 "Walden Pocket 66¢

Drawing Knives.
 Hart Mfg. Co.'s 66¢
 Adjustable Handle 66¢

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 Tinned 40¢
 "No. 1 40¢
 "No. 2 40¢
 "No. 3 40¢
 "No. 4 40¢
 "No. 5 40¢
 "No. 6 40¢
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 "No. 9 40¢
 "No. 10 40¢

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 Nicholson 40¢
 Diaston 40¢
 Butcher 40¢
 Sawyer 40¢
 K. M. Boynton, new list 40¢

Fluting Machines.
 Eagle—2 1/2 in. roll 66¢
 "3 in. roll 66¢
 "4 in. roll 66¢
 "5 in. roll 66¢
 "6 in. roll 66¢
 "7 in. roll 66¢
 "8 in. roll 66¢
 "9 in. roll 66¢
 "10 in. roll 66¢

Generators.
 Favorite Com. Fluter & Had Iron 66¢
 "Favorite Com. Fluter & Had Iron 66¢

Hammers.
 Verkes & Plumb's, new list 66¢
 "Verkes & Plumb's, new list 66¢

Handfiles.
 Boynton's Pat. Saw Handfiles 66¢
 "Boynton's Pat. Saw Handfiles 66¢

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 Verkes & Plumb, new list 66¢
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 "Strap and T. 66¢

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 "Available 66¢

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 Plated 40¢
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Nails.
 See Pittsburgh Trade Report.
 Best Quality Refined Cast Steel.

Square, Flat, Octagon and Round.
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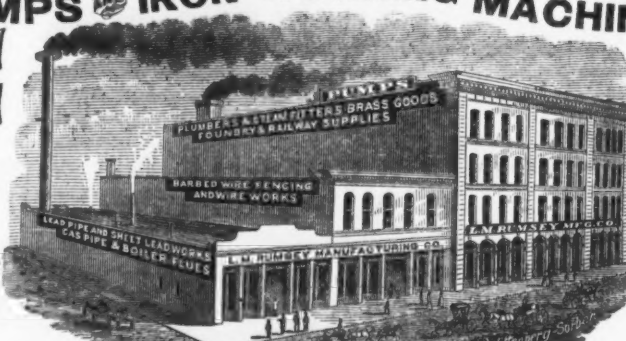
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 Crucible 80¢
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Crucible.
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MANUFACTURERS & JOBBERS OF
PUMPS & IRON WORKING MACHINERY,



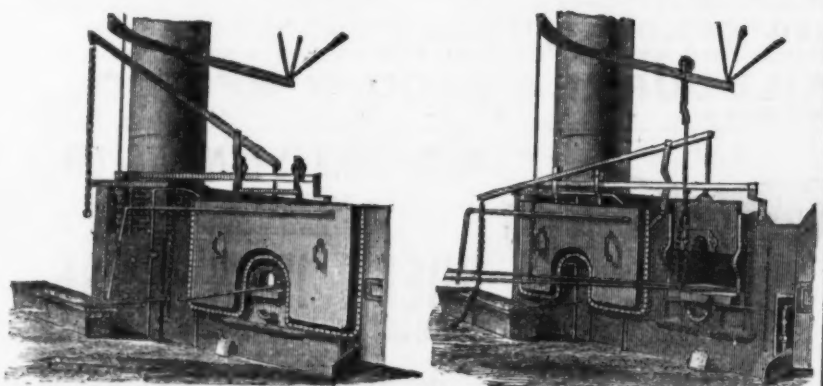
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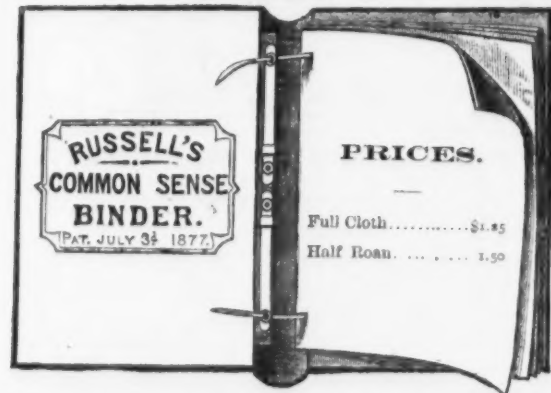
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For Protecting the Men from Heat when Working in Front of Puddling, Heating and other Furnaces.

H. McDONALD, Patentee,
MANAGER SLIGO ROLLING MILLS,
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INCLUDING IN GREAT VARIETY THE WELL-KNOWN
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CONTINUOUS FEED
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For oiling valves and cylinders of steam engines by the only perfect method.
Through the Steam Pipe
The oil passes in sight, drop by drop, into the column of steam where it vaporizes, thus becoming a steam lubricant, oiling perfectly every part reached by the steam. Any clean oil, black or white, light or heavy, may be used. Saves from 50 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on twenty days' trial, if desired. In ordering give diameter of cylinder.
NOTICE.—The first Lubricators ever made, showing the oil passing drop by drop through a transparent water chamber, were devised by us, and the same are fully embraced by many Letters Patent owned and controlled by us. Lubricators of every nature embodying the above features, made by other parties, are encroachments upon our rights, and we will hold purchasers and users, as well as manufacturers, responsible in damages for such violations.
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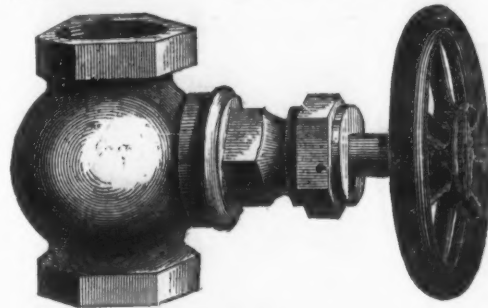
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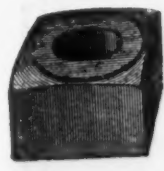
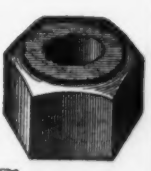


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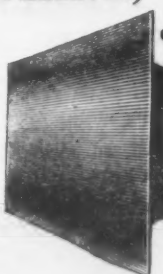

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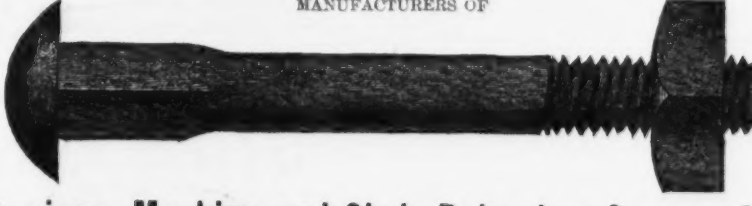

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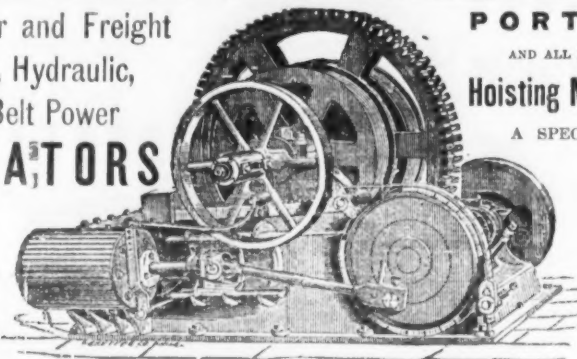
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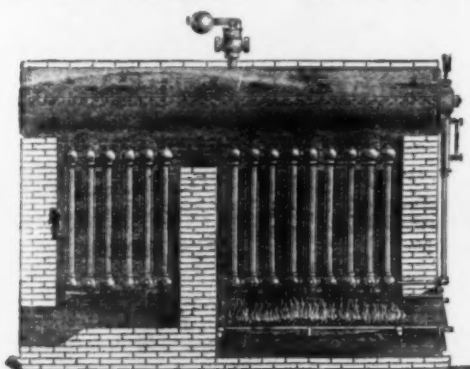
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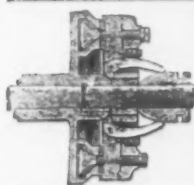
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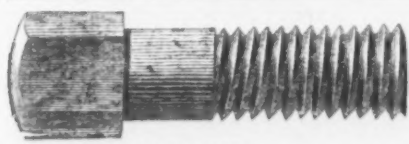
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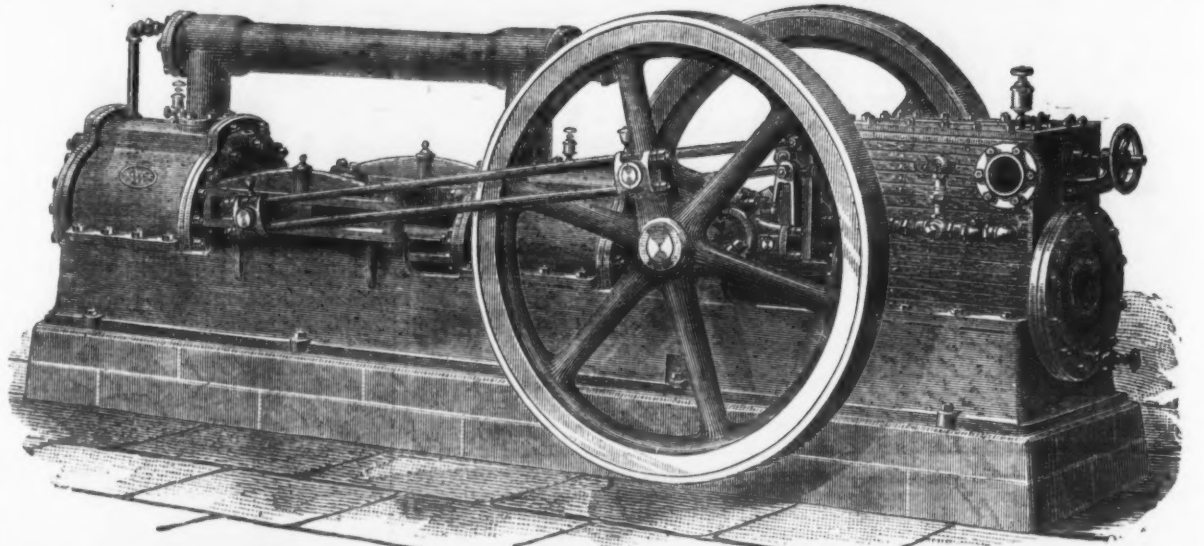
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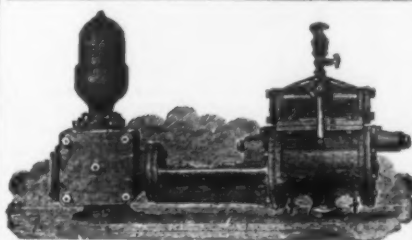
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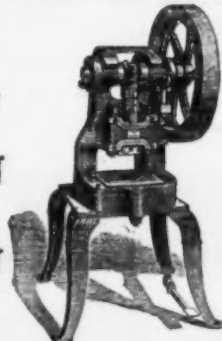
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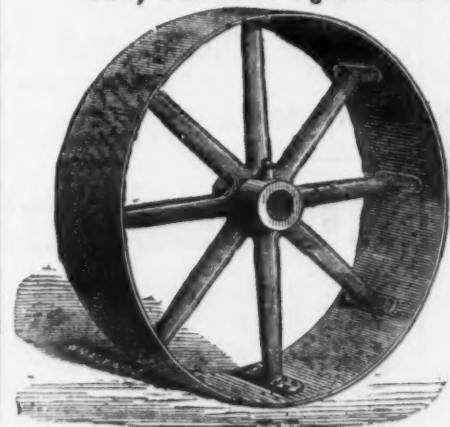
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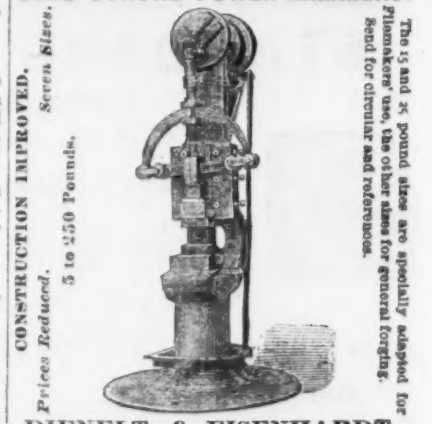
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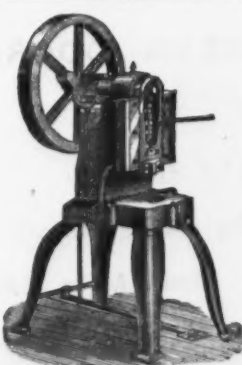
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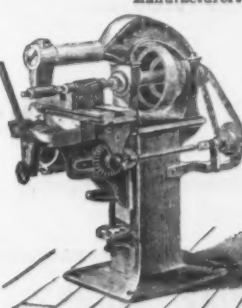


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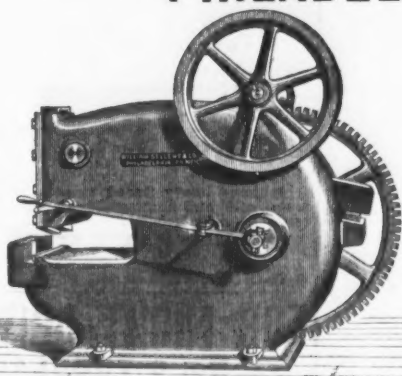
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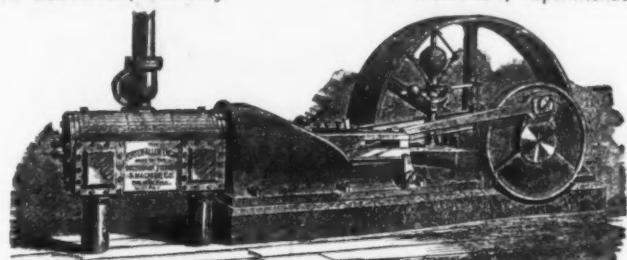
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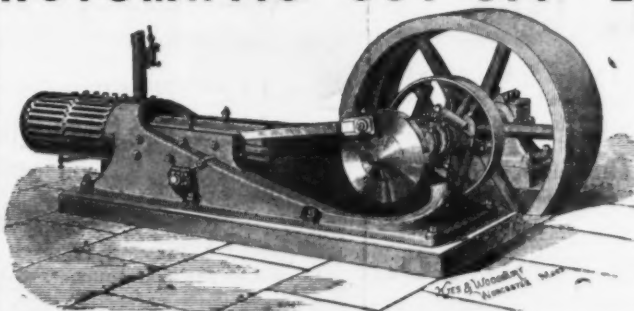
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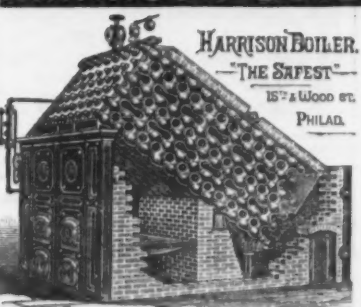
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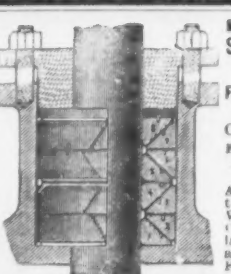
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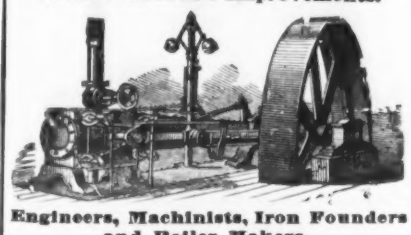
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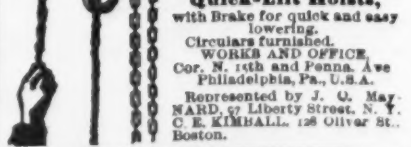
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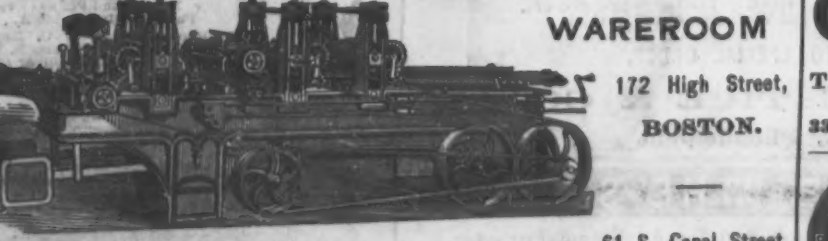
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